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GRAPHIC PRESENTATION OF PACIFIC SARDINE AGE COMPOSITION DATA

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UNITED STATES DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

United States Department of the Interior, Stewart L. Udall, Secretary
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By

Robert S. Wolf

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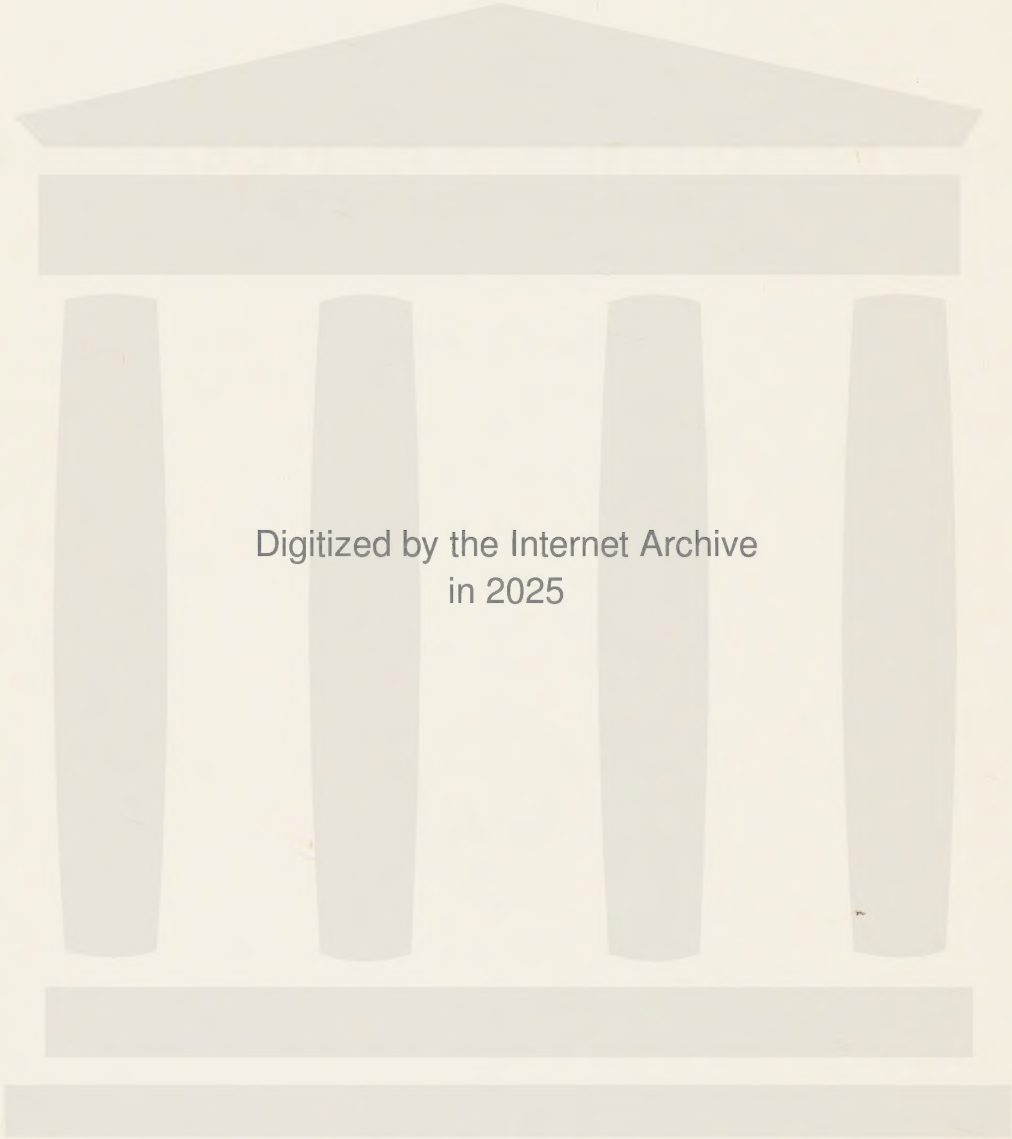

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GRAPHIC PRESENTATION OF PACIFIC SARDINE AGE COMPOSITION DATA

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ABSTRACT

Seasonal age composition summaries of the Pacific sardine in numbers of fish by year class and age are presented in graphic form by port or region of landing for the seasons of 1932-33 through 1959-60. A pictorial history of the sardine fishery for 28 years is thus presented in the bar charts, which illustrate the relative importance of certain year classes in the seasonal catch totals, and in the fluctuations of those totals over this period.

Estimates of the age composition of the commercial catch of the Pacific sardine *Sardinops caerulea* (Girard) are available over 28 seasons from five ports or four regions[1] of landing. These data have been published in separate papers which have recently been assembled under a single cover (Wolf[2]). Age composition data from that report form the basis of the figures presented herein.

Each figure consists of one or more seasonal age summaries of a port or region presented as a bar chart. Each season's bar chart represents the numbers of fish landed in millions by successive year classes. At the bottom of each figure an age scale has been added. For identification, each year class retains a characteristic pattern of markings on its bar, which represent that year class during its appearance in the landings, regardless of port or season.

Data from ports in British Columbia, Washington, and Oregon have been combined to form seasonal age composition summaries from the Pacific Northwest for the seasons of 1941-42 through 1948-49. These are shown in figures 1 and 2. Seasonal summaries from San Francisco for 1940-41 through 1950-51 are presented in figures 3 through 5. Monterey summaries from 1932-33 through 1952-53 plus 1954-55, 1958-59, and 1959-60 appear in figures

[1] Pacific Northwest totals include data from British Columbia, Washington, and Oregon ports. From 1956-57 through 1959-60 seasons, port summaries have represented regional totals. The major port of the region has been used to designate the region. Details of regional apportionment are given in Daugherty and Wolf, 1960, p. 189.

[2] Wolf, Robert S. Age composition of the commercial catch of the Pacific sardine, 1932-60. U. S. Fish and Wildlife Service, Research Report. In press.

6 through 15. In figures 16 through 30 the summaries for San Pedro from 1932-33 through 1959-60 are shown. Ensenada summaries from 1951-52 through 1959-60 appear in figures 31 and 32.

These figures present a graphic history of the Pacific sardine catch over 28 seasons and illustrate general trends of production and age composition in the fishery. For example, in the Pacific Northwest the rapid decrease in total landings was accompanied by a gradual increase in average age over the eight seasons, 1941-42 through 1948-49. In San Francisco a similar pattern occurred during 11 seasons. Monterey summaries show a gradual increase in fishery production, reaching a peak in the early 1940's with a stable average age, followed by a decrease in catch and an increase in average age. San Pedro is the only port for which consecutive seasonal summaries over the entire period from 1932-33 through 1959-60 are available. These exhibit fluctuations similar to those at Monterey, but with lesser amplitudes. Ensenada summaries indicate a gradual increase in landings through the 1950's. This is the reverse of trends in more northern areas and undoubtedly resulted from fishery expansion rather than a population increase in this area. The average age of fish at Ensenada, though usually lower than that of San Pedro during this period, has remained relatively stable.

Certain year classes of sardines were distinctly above the average in abundance. Whenever one or more of these year classes have appeared in the catch, the total catch has increased. In Monterey and San Pedro, the 1931 and 1932 classes were above average in abundance. The four year classes spawned from 1936 through 1939 were responsible for the good production of sardines at all ports in the early 1940's. The year classes produced from 1940 through 1945 were above the 28-year average in numbers, but they were not large enough to sustain the level of catch established by their four predecessors. The 1946, 1947, and 1948 classes were somewhat above average in abundance but were followed by extremely weak classes in 1949 and 1950. Subsequent to 1950, all year classes have been markedly below the 28-year average in abundance, with only the 1952 and 1956 classes showing even moderate success.

LITERATURE CITED

DAUGHERTY, ANITA E., and ROBERT S. WOLF.
1960. Age and length composition of the sardine catch off the Pacific coast of the United States and Mexico in 1957-58. California Fish and Game, vol. 46, no. 2, p. 189-194.

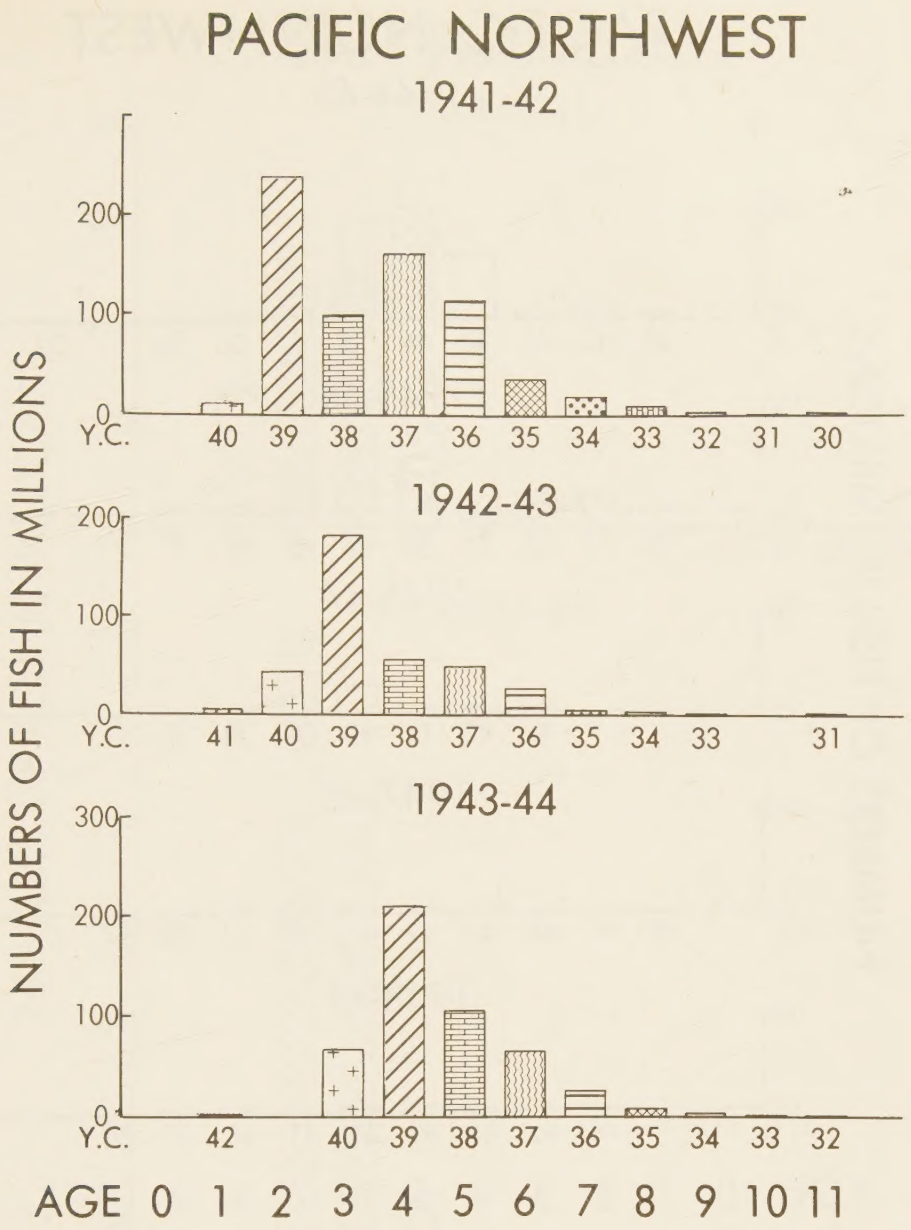

Figure 1.--Catch in millions of fish, by age and year class (Y.C.), for ports of the Pacific Northwest for the summer seasons 1941 through 1943.

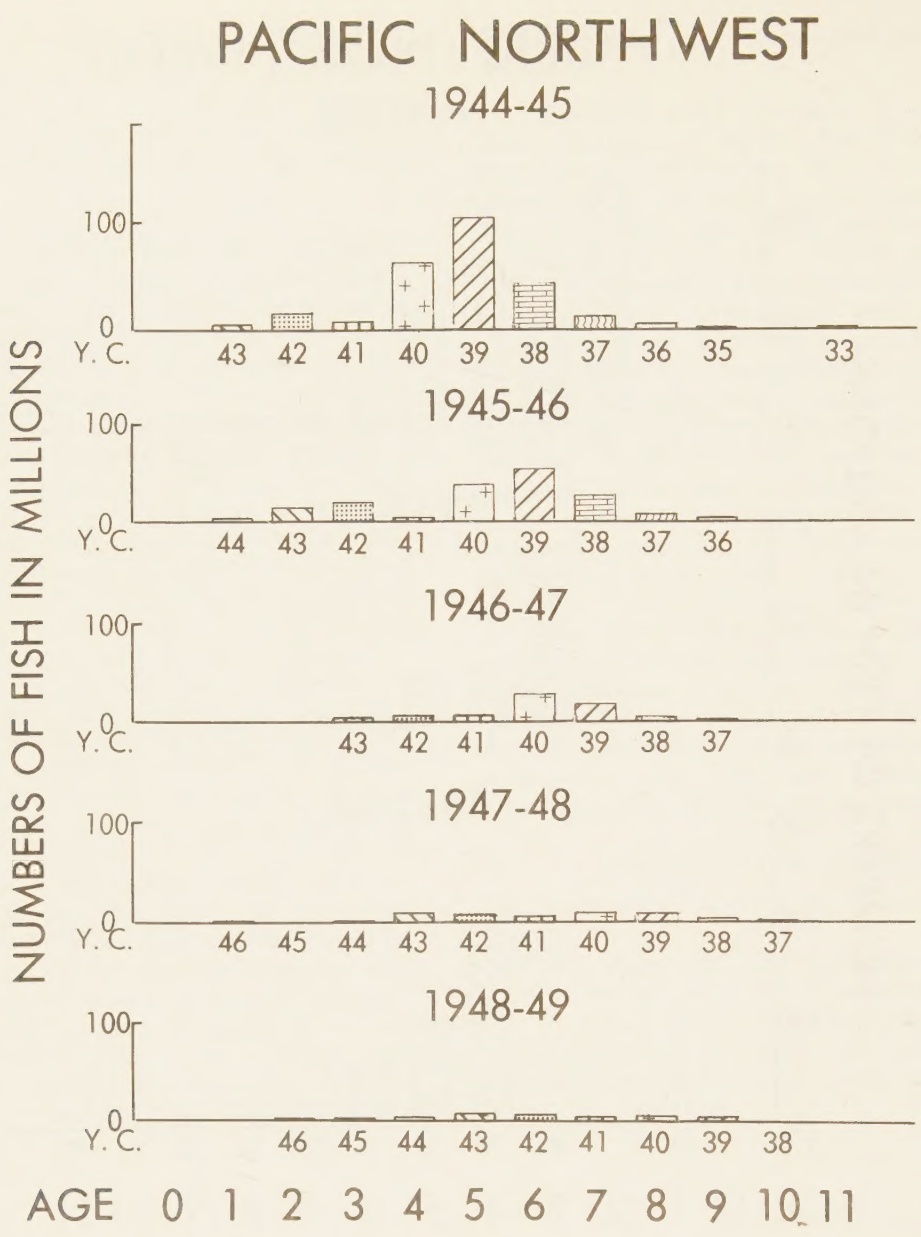

Figure 2.--Catch in millions of fish, by age and year class, for ports of the Pacific Northwest for the summer seasons 1944 through 1948.

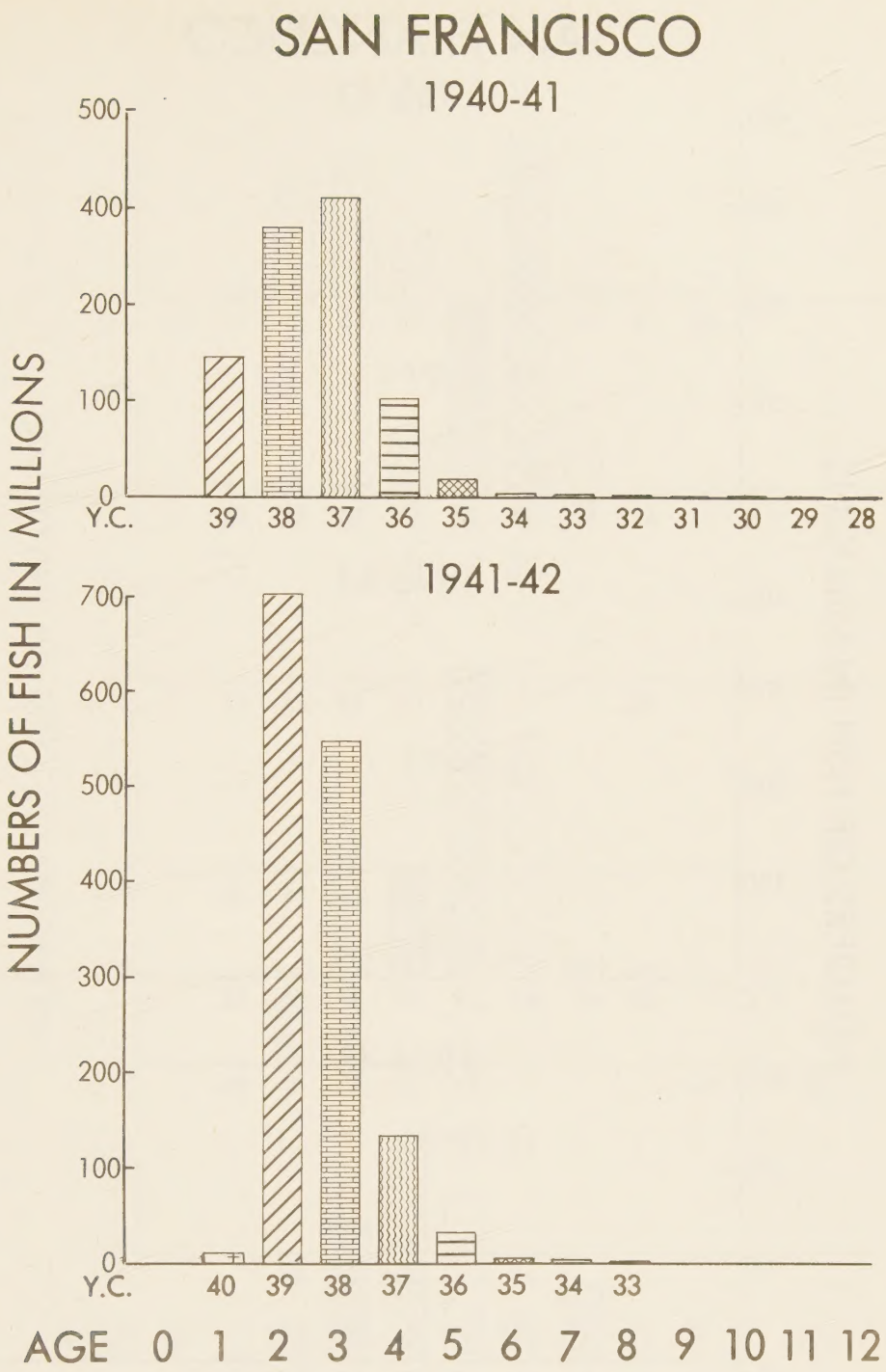

Figure 3.--Catch in millions of fish, by age and year class, for San Francisco for the seasons 1940-41 and 1941-42.

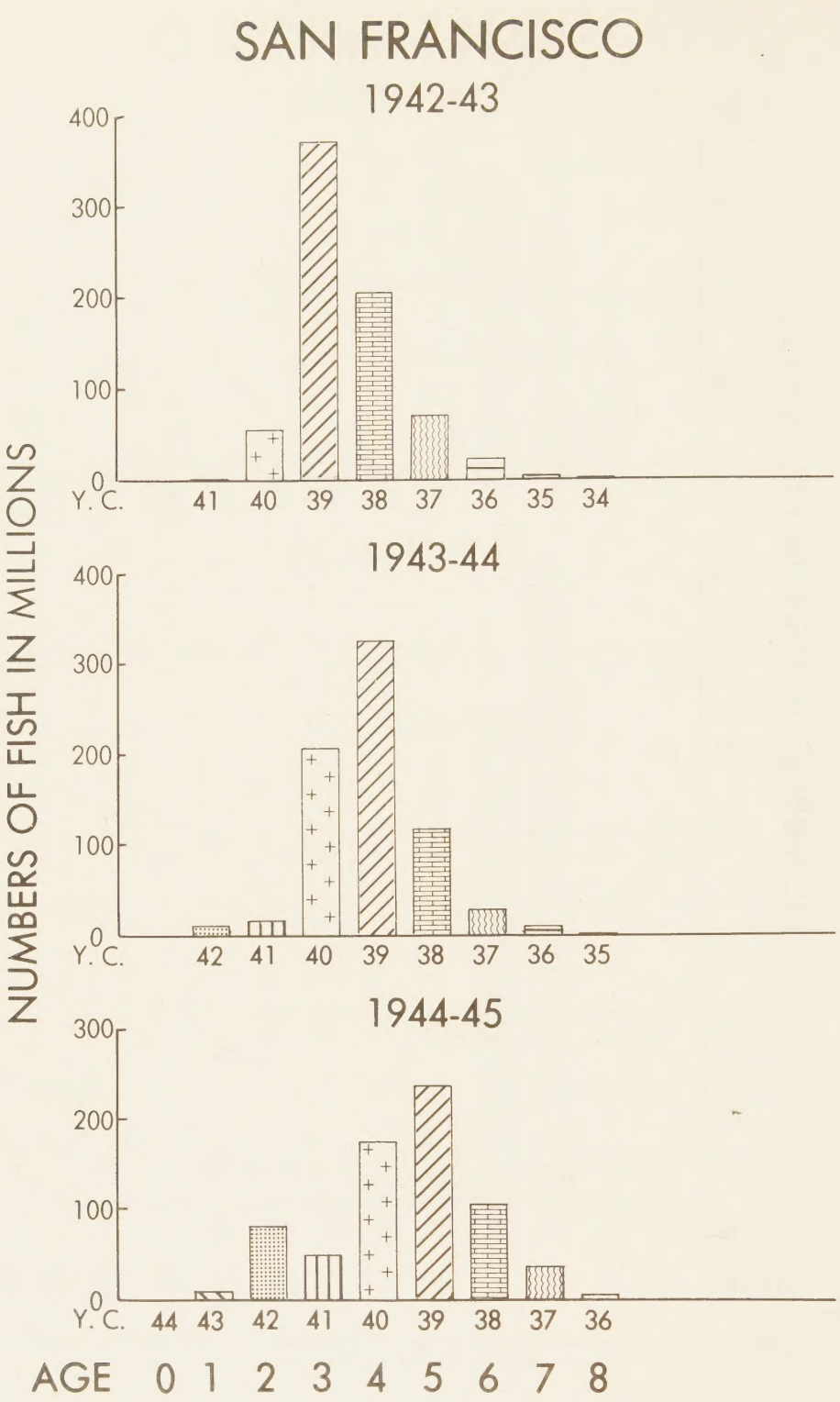

Figure 4.--Catch in millions of fish, by age and year class, for San Francisco for the seasons 1942-43 through 1944-45.

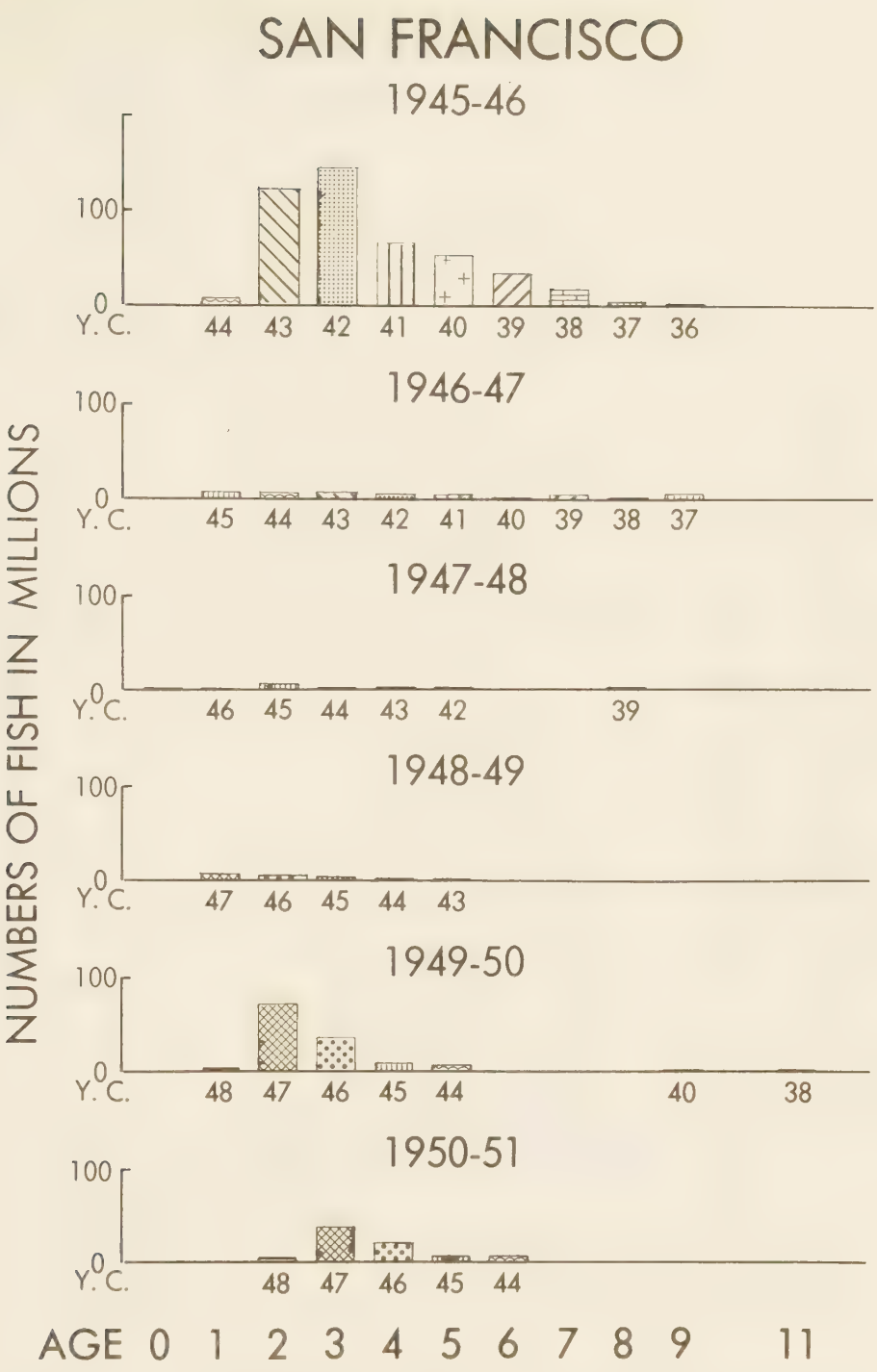

Figure 5.--Catch in millions of fish, by age and year class, for San Francisco for the seasons 1945-46 through 1950-51.

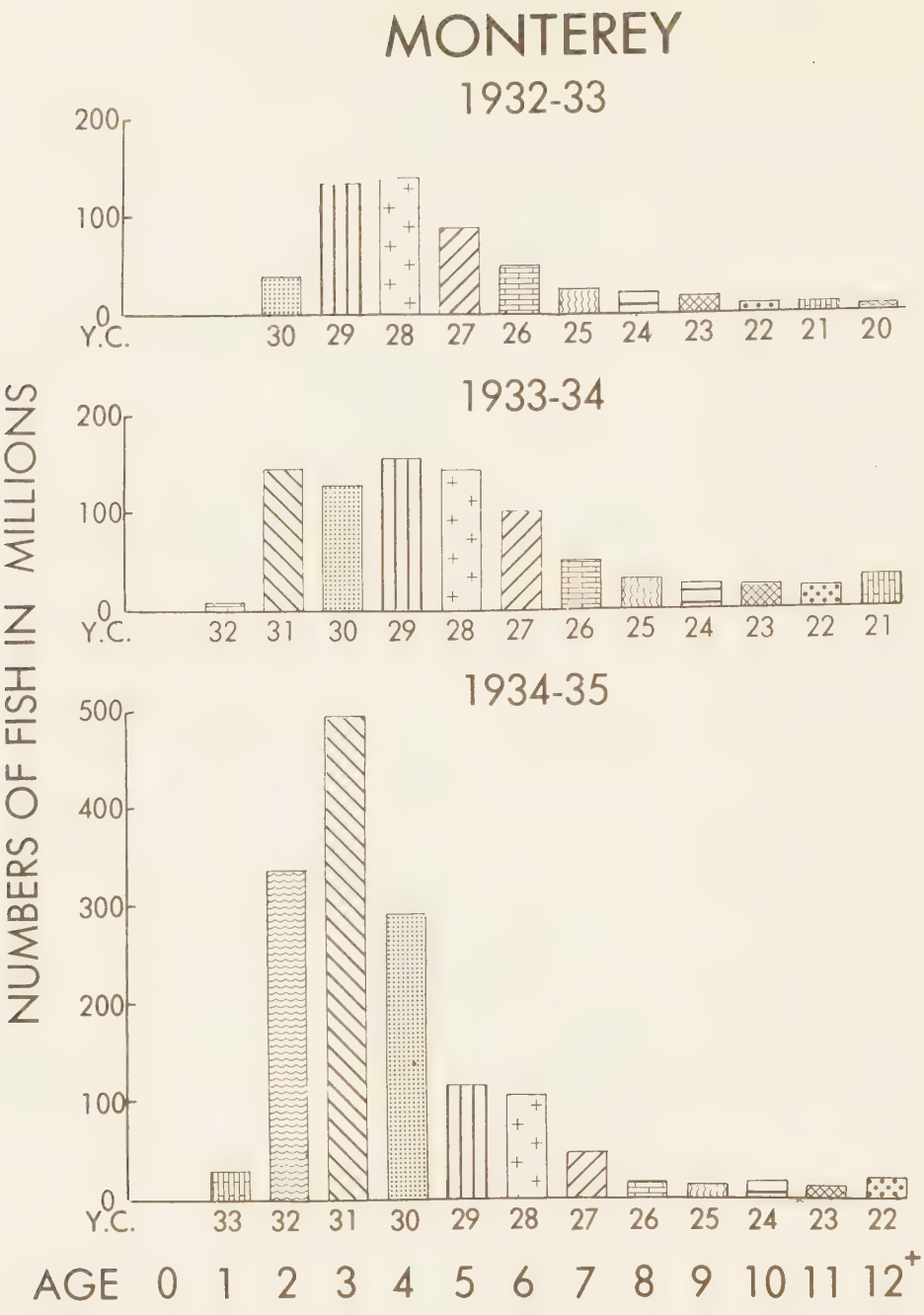

Figure 6.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1932-33 through 1934-35.

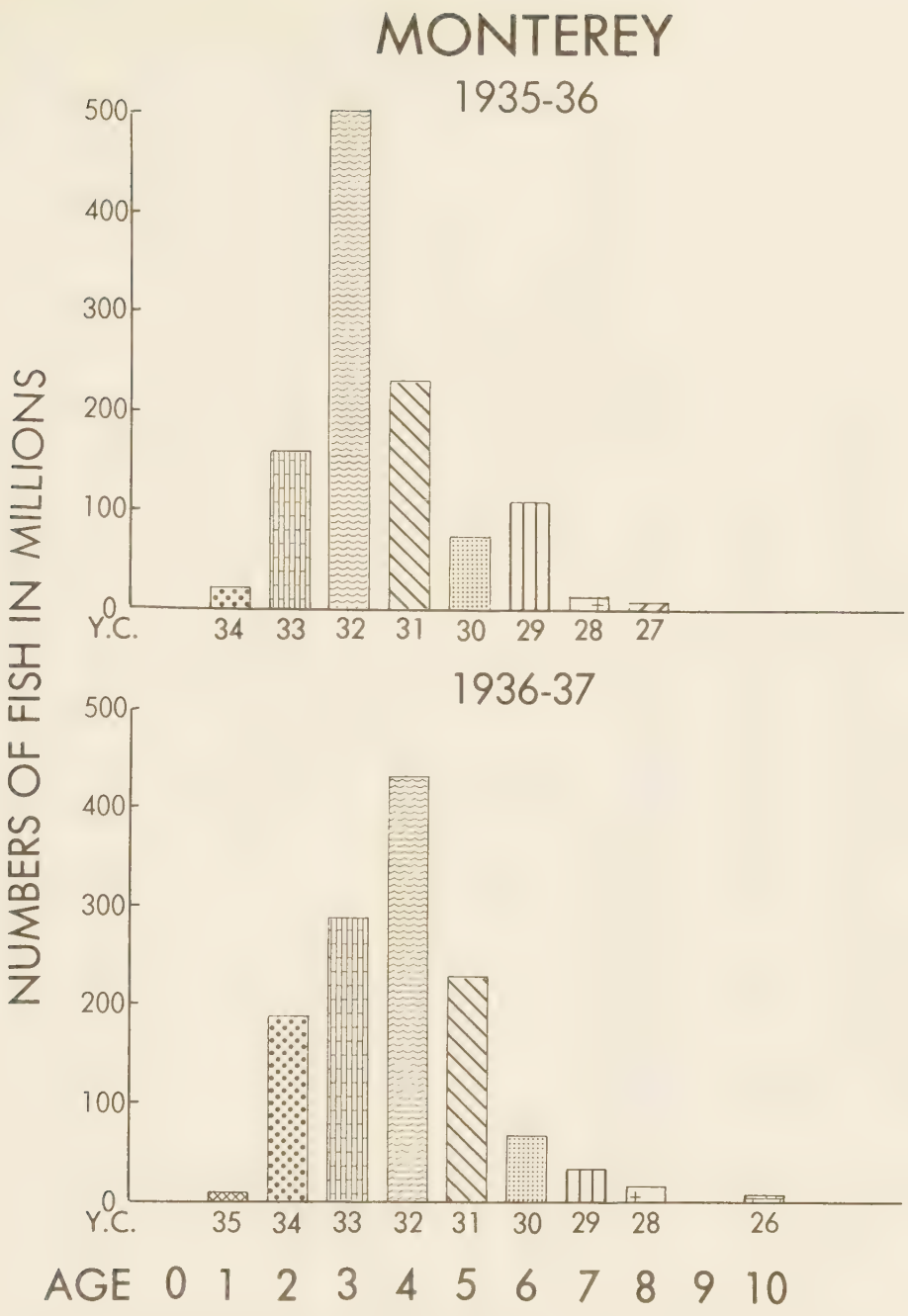

Figure 7.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1935-36 and 1936-37.

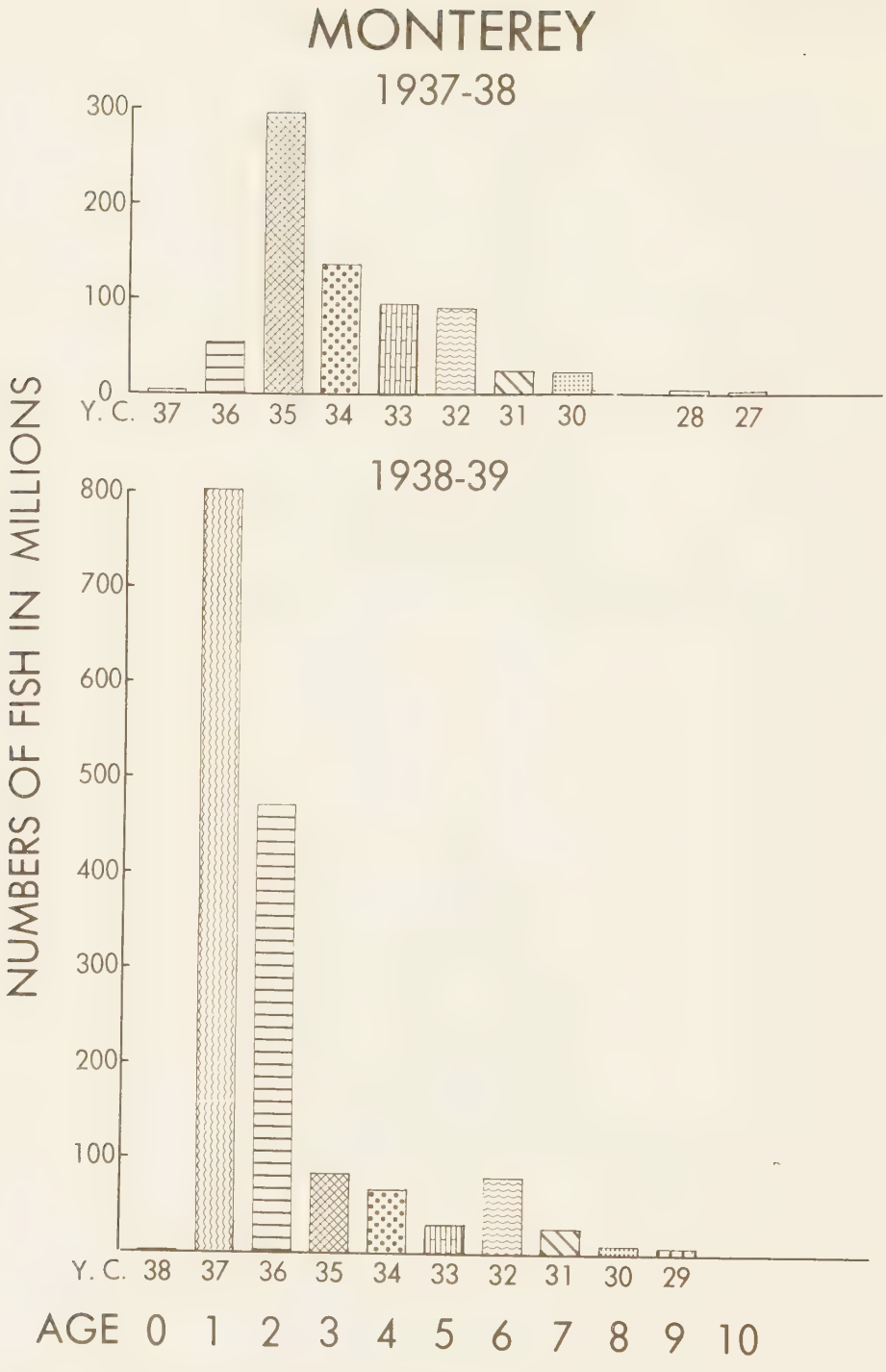

Figure 8.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1937-38 and 1938-39.

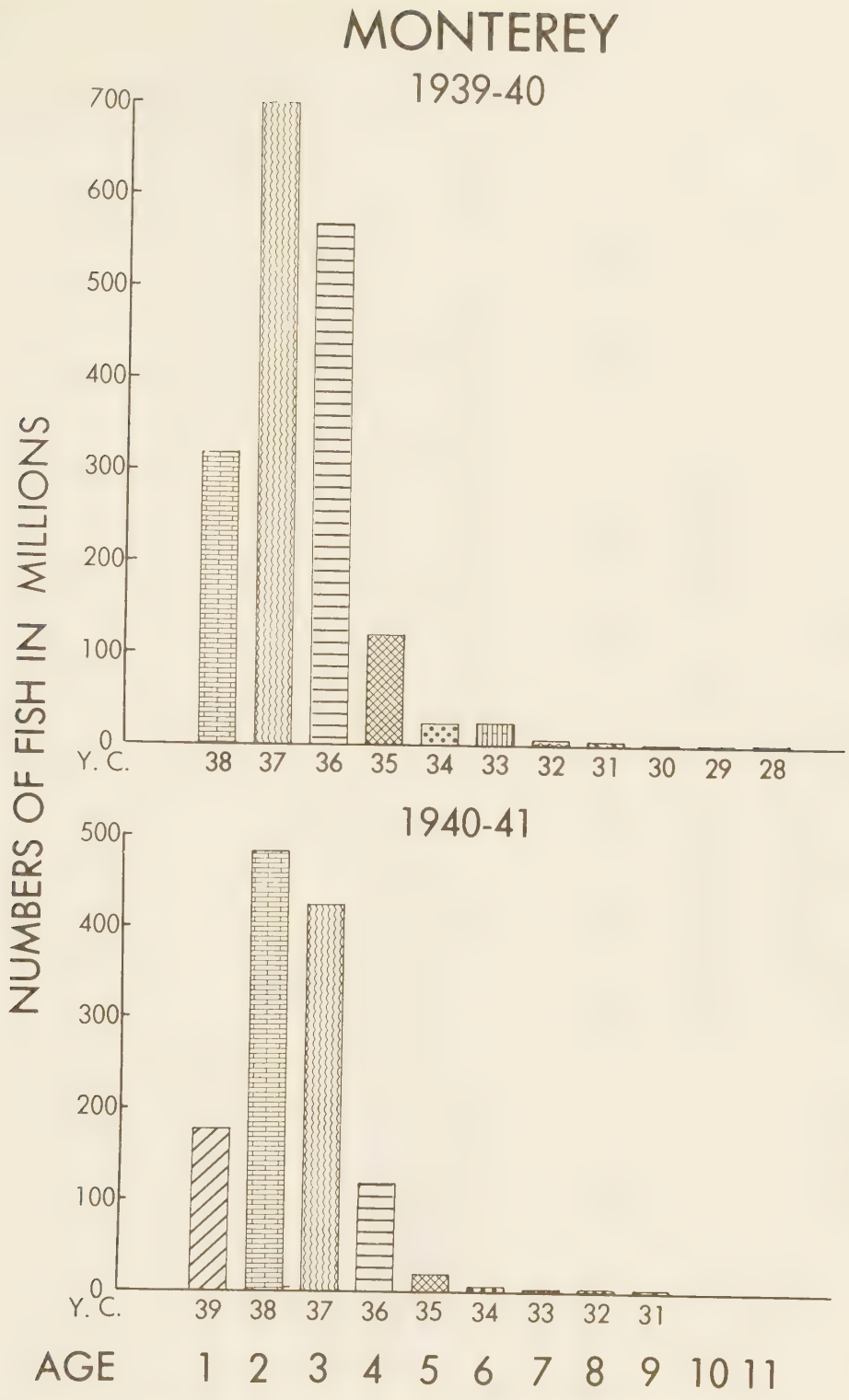

Figure 9.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1939-40 and 1940-41.

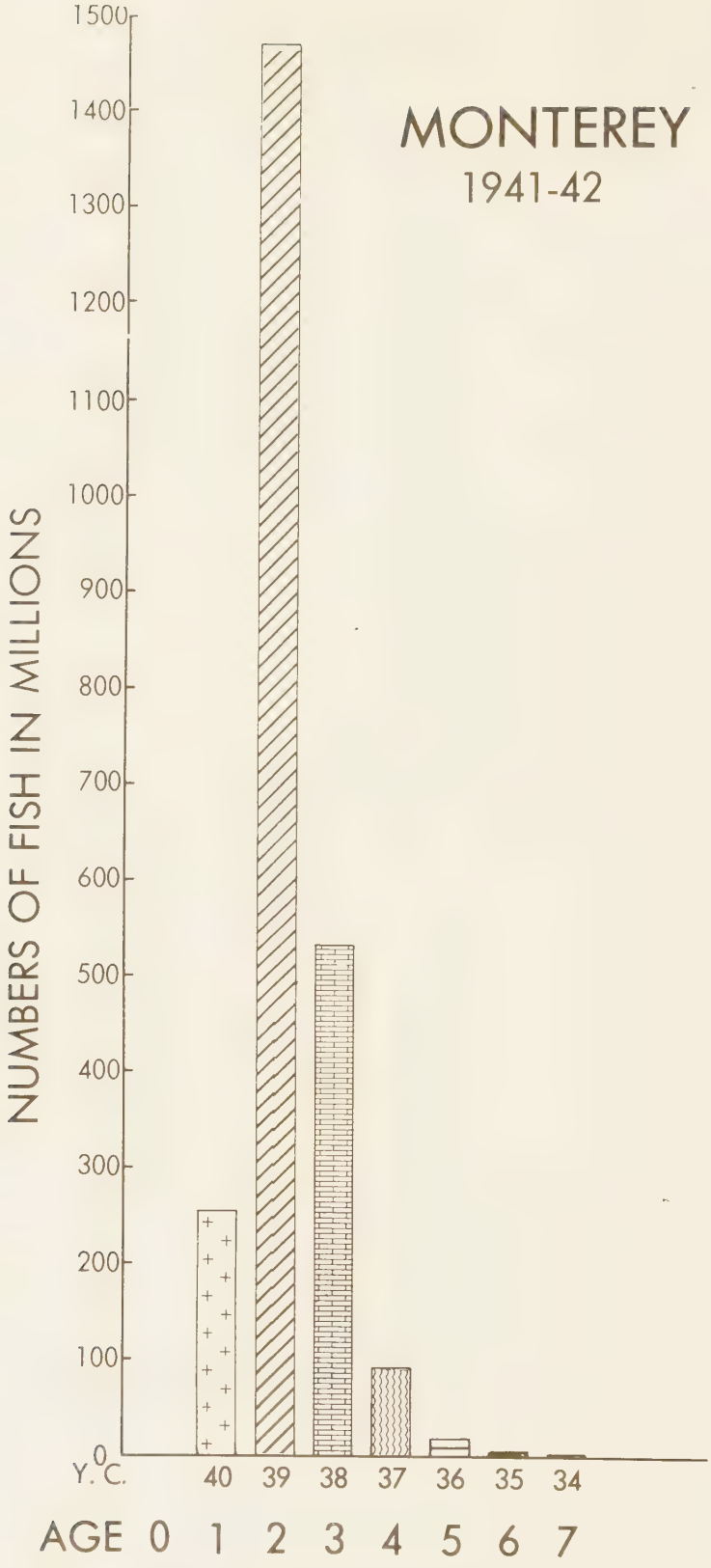

Figure 10.--Catch in millions of fish, by age and year class, for Monterey for the season 1941-42.

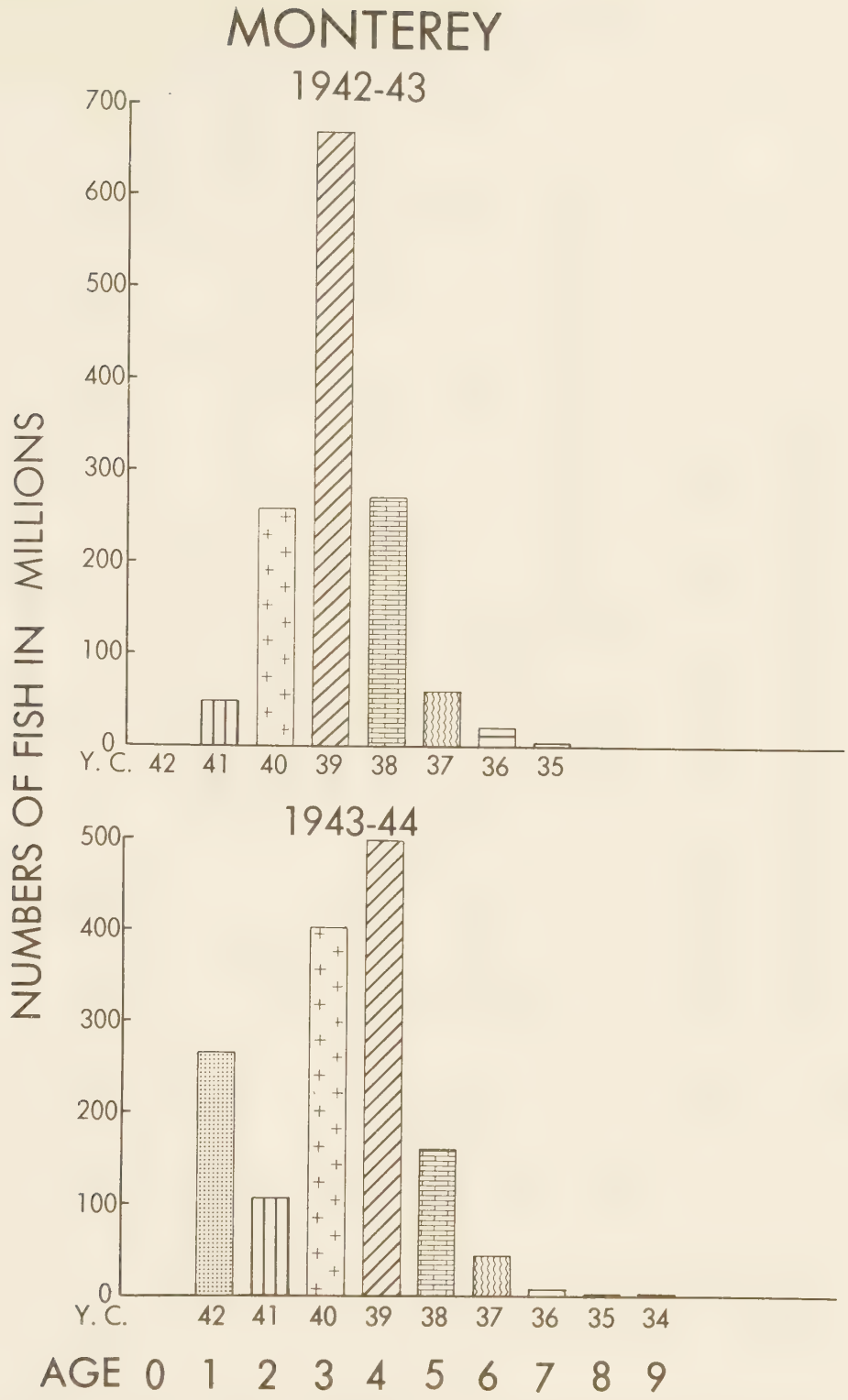

Figure 11.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1942-43 and 1943-44.

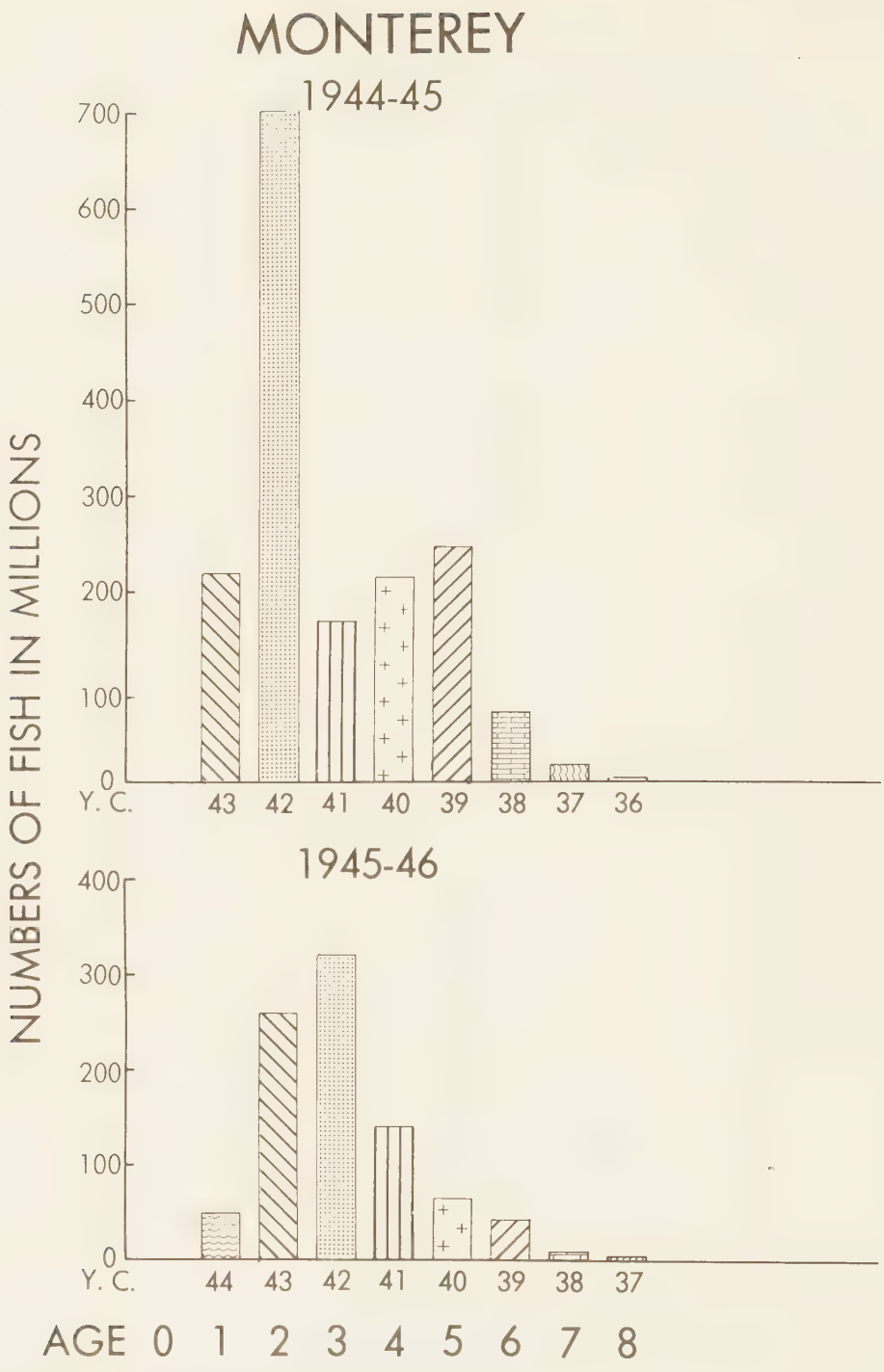

Figure 12.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1944-45 and 1945-46.

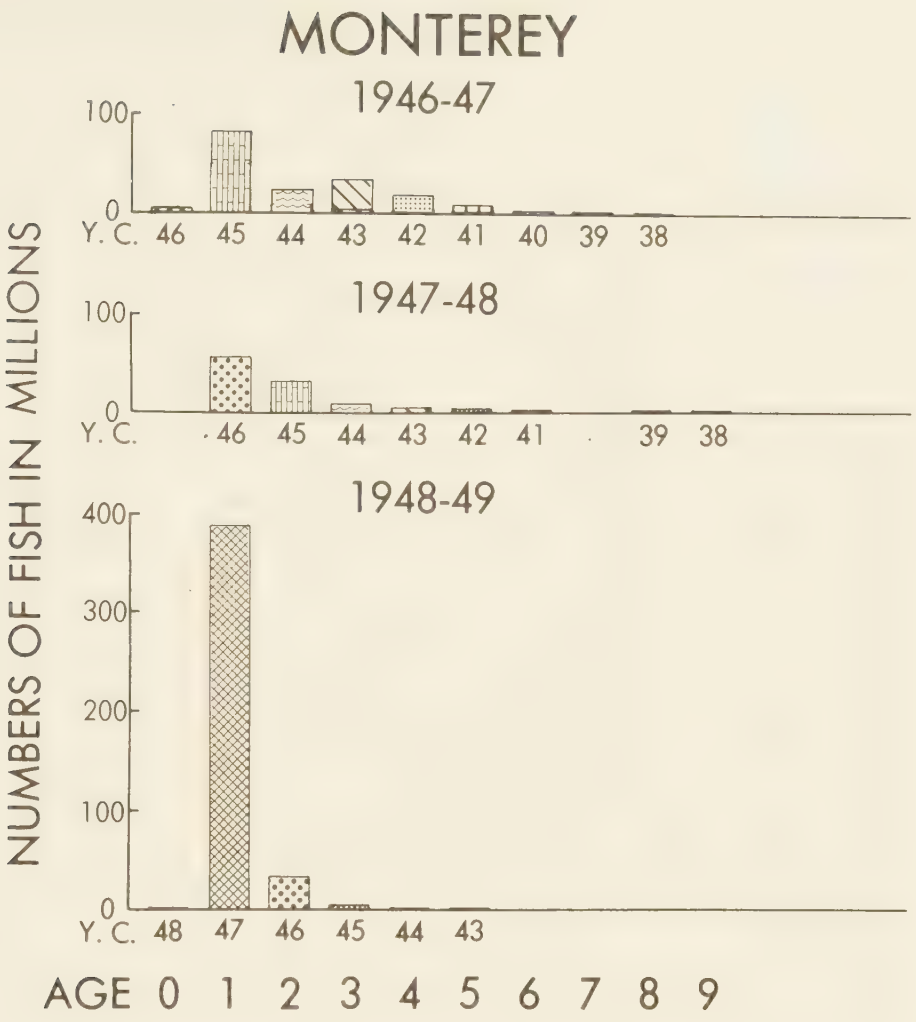

Figure 13.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1946-47 through 1948-49.

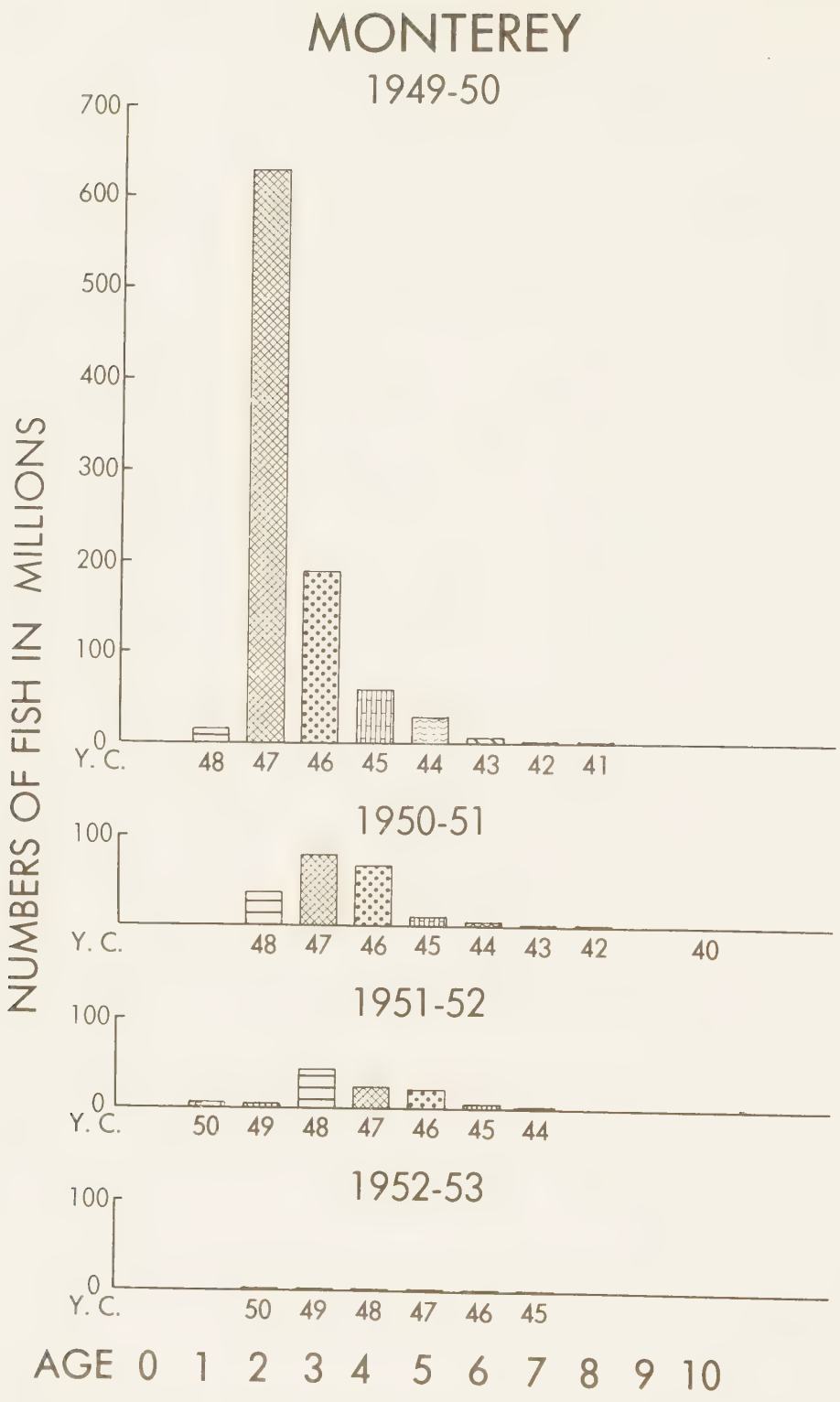

Figure 14.--Catch in millions of fish, by age and year class, for Monterey for the seasons 1949-50 through 1952-53.

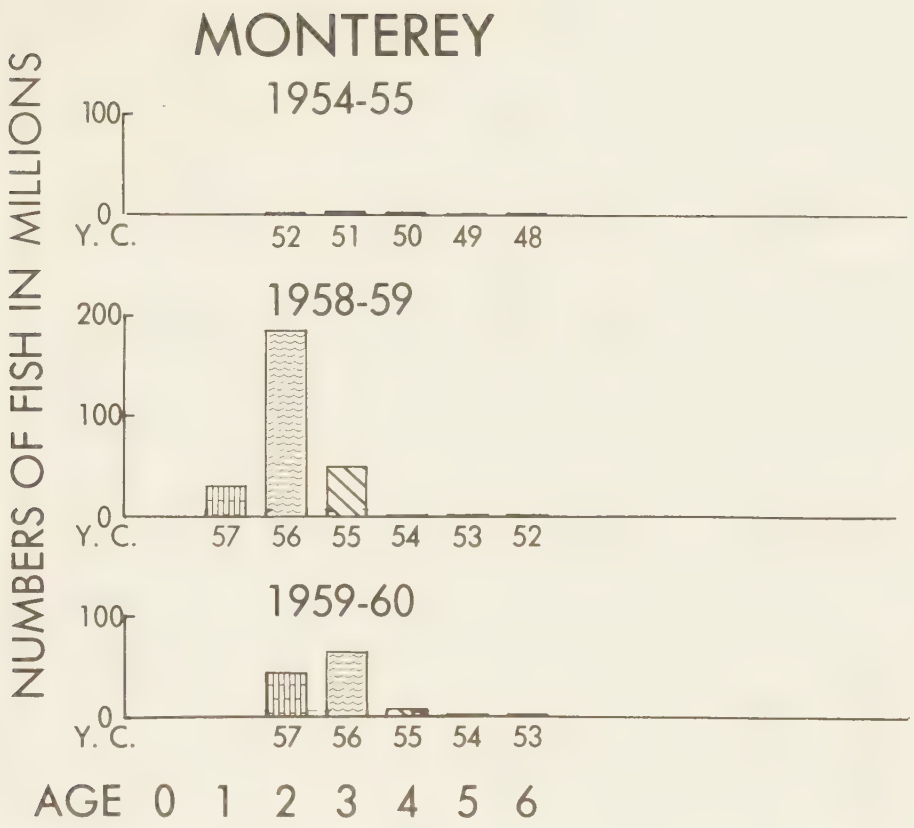

Figure 15.--Catch in millions of fish, by age and year class, for Monterey for the season 1954-55, and for Central California for the seasons 1958-59 and 1959-60.

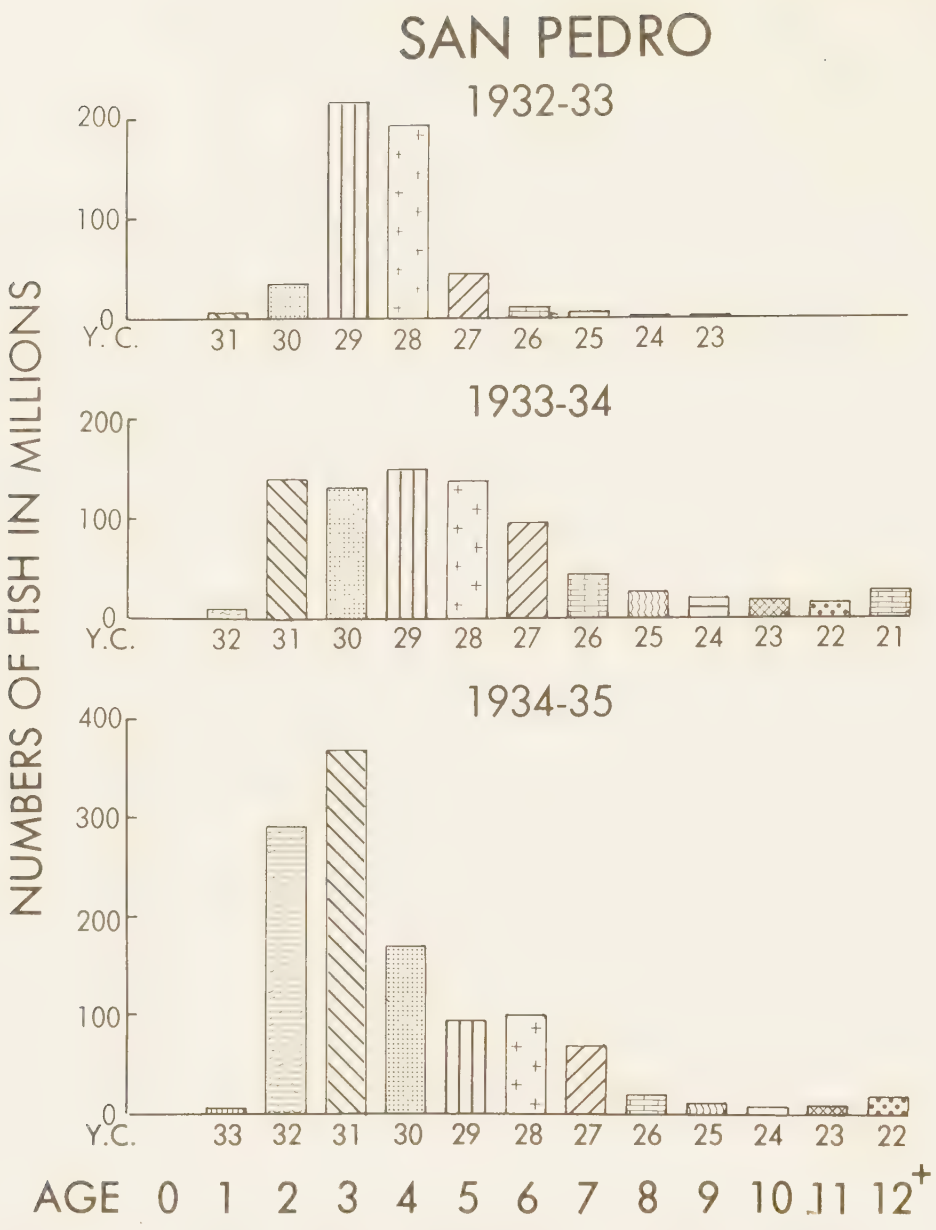

Figure 16.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1932-33 through 1934-35.

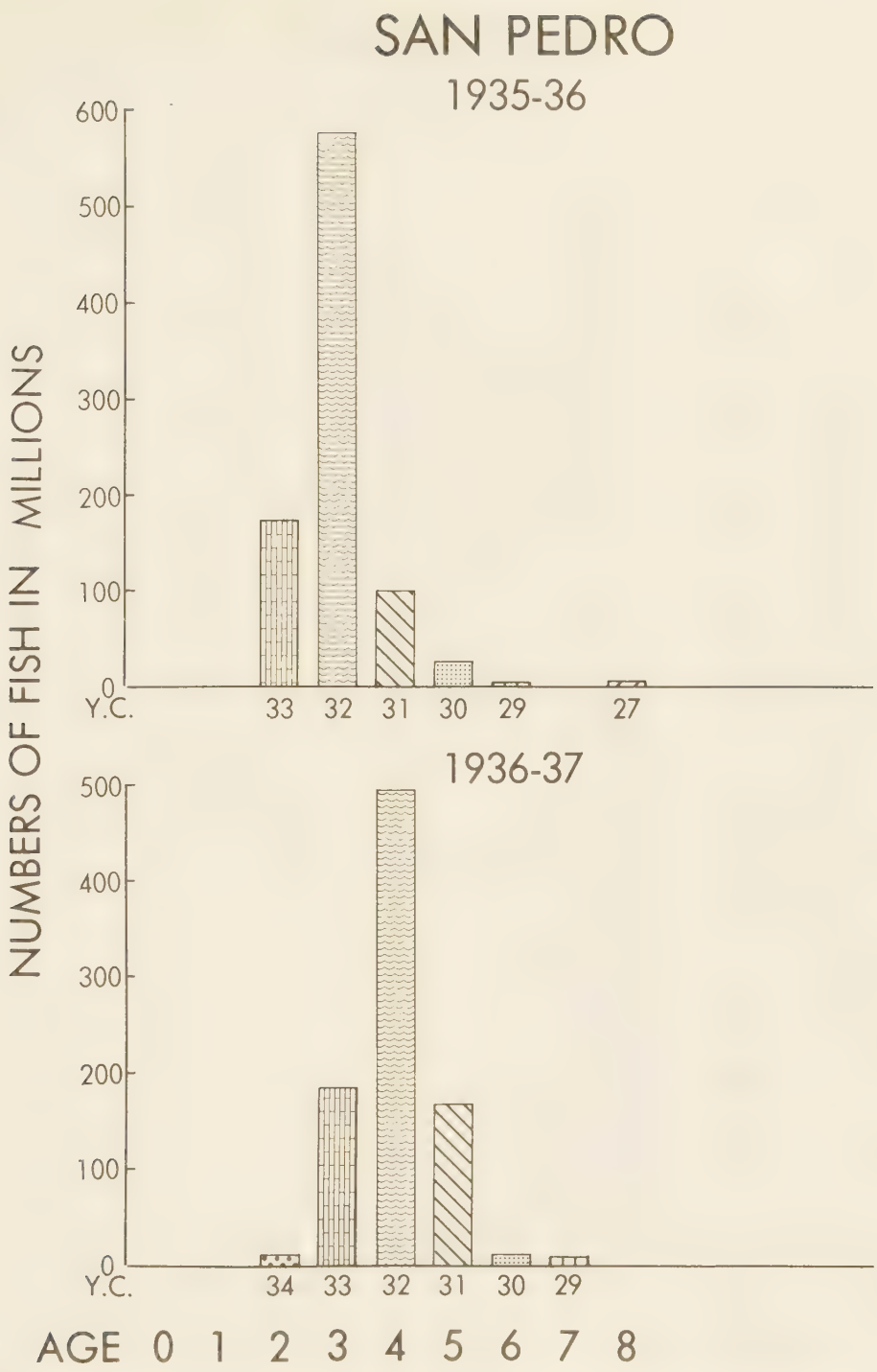

Figure 17.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1935-36 and 1936-37.

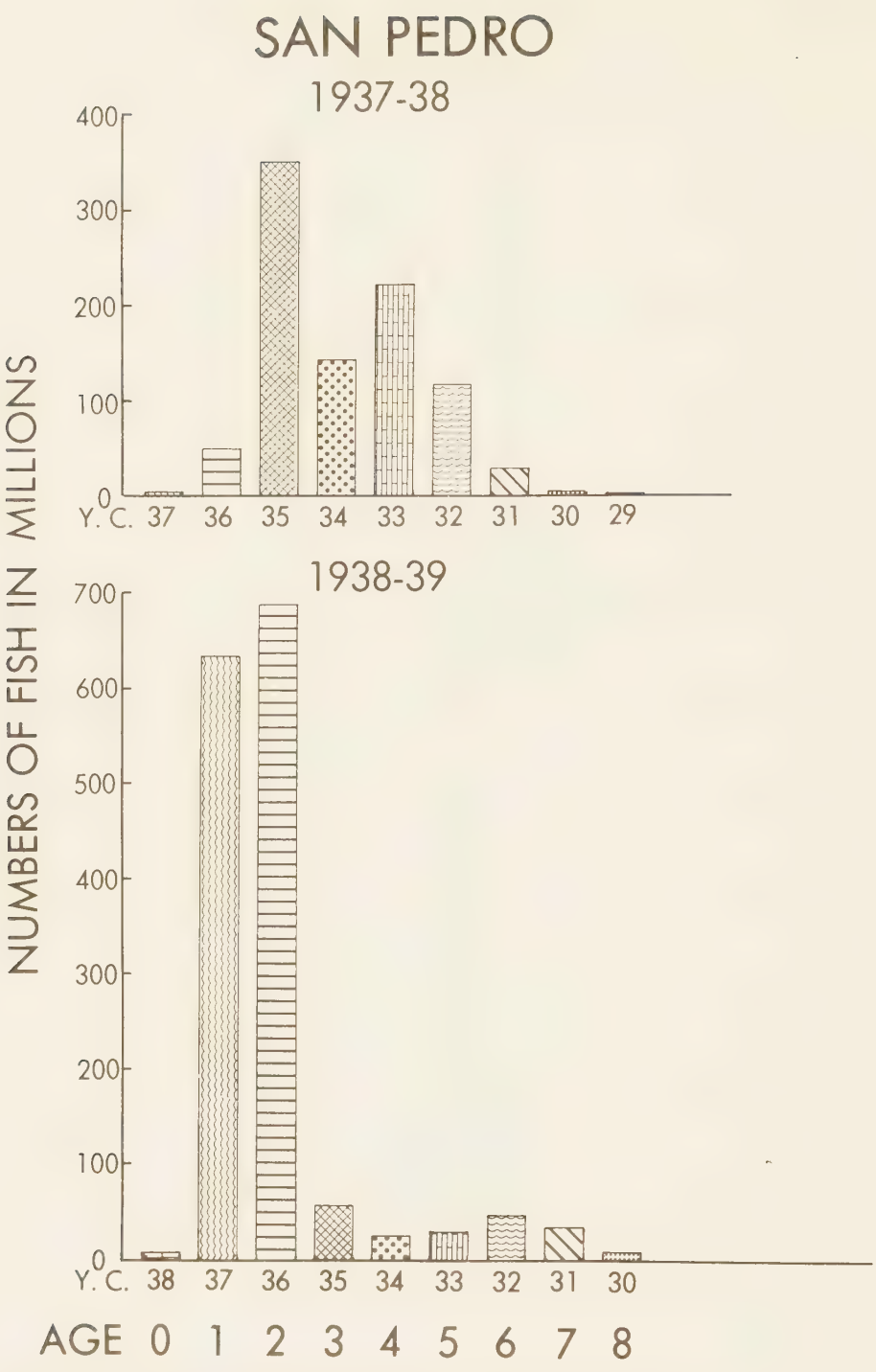

Figure 18.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1937-38 and 1938-39.

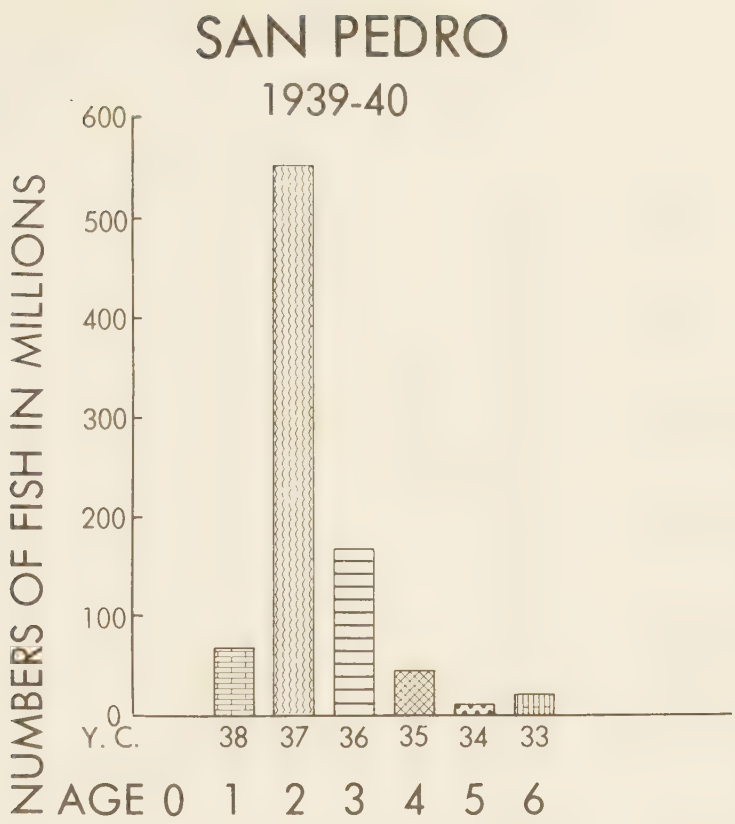

Figure 19.--Catch in millions of fish, by age and year class, for San Pedro for the season 1939-40.

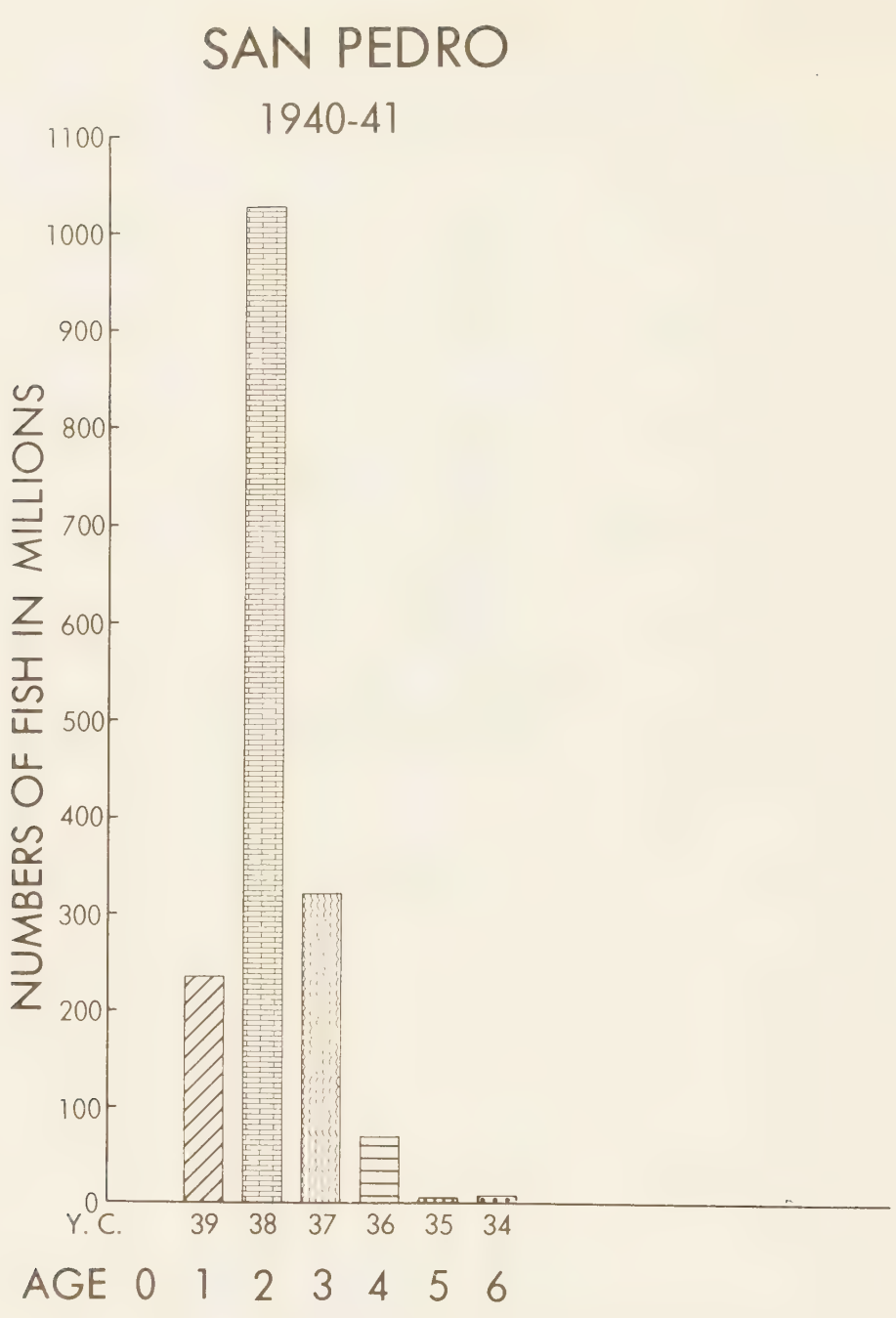

Figure 20.--Catch in millions of fish, by age and year class, for San Pedro for the season 1940-41.

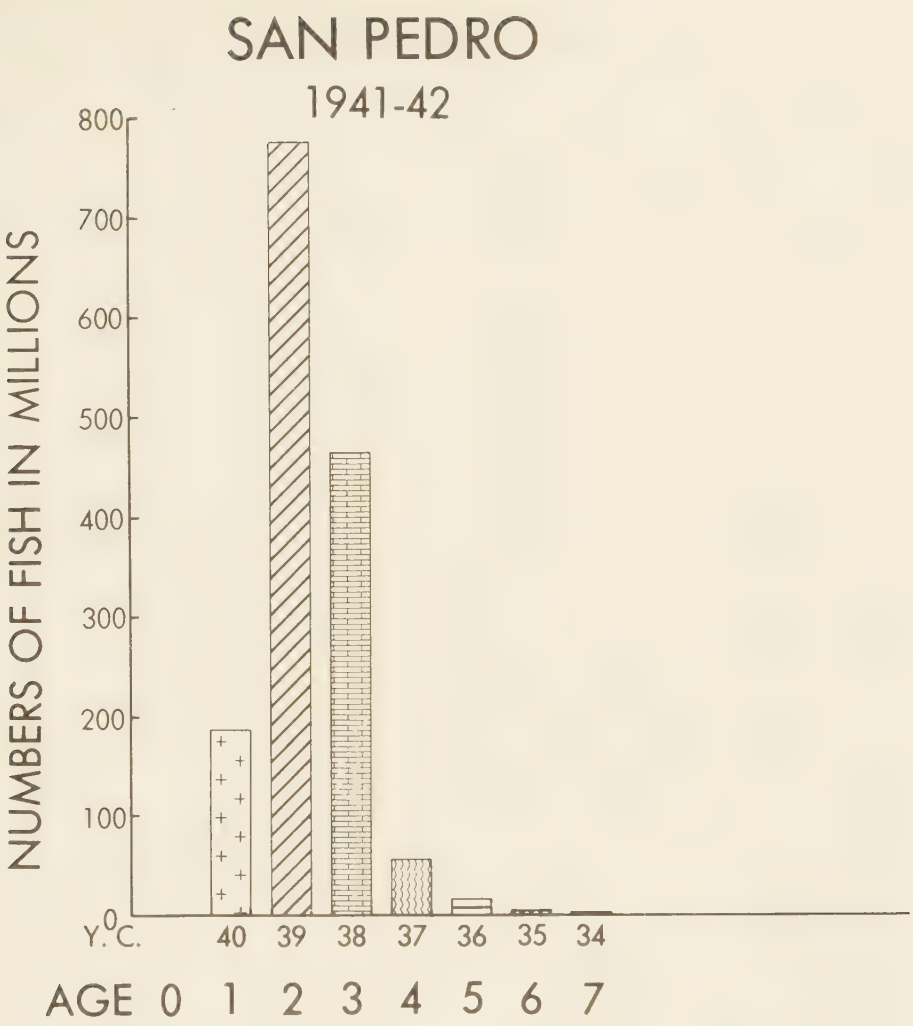

Figure 21.--Catch in millions of fish, by age and year class, for San Pedro for the season 1941-42.

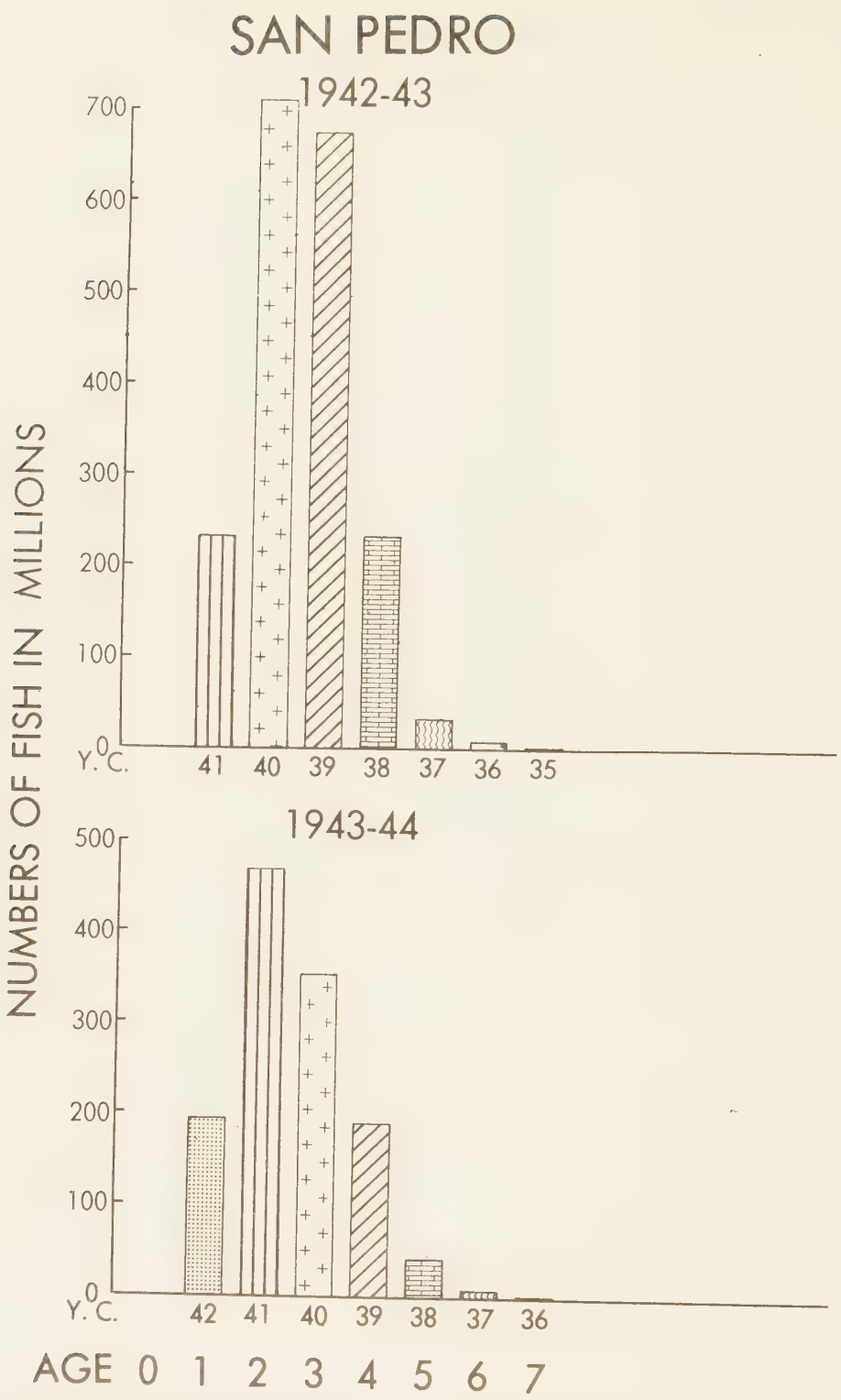

Figure 22.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1942-43 and 1943-44.

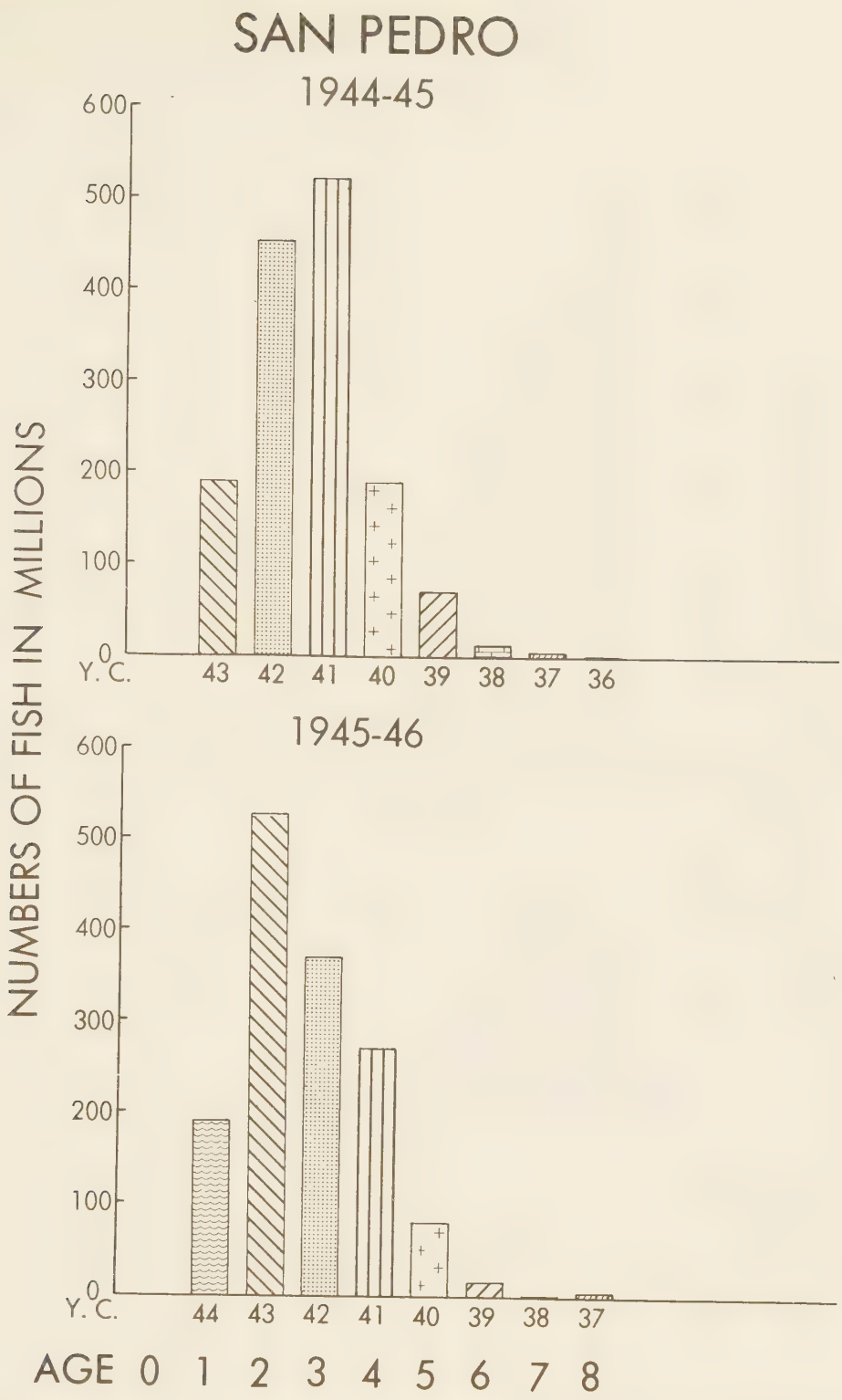

Figure 23.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1944-45 and 1945-46.

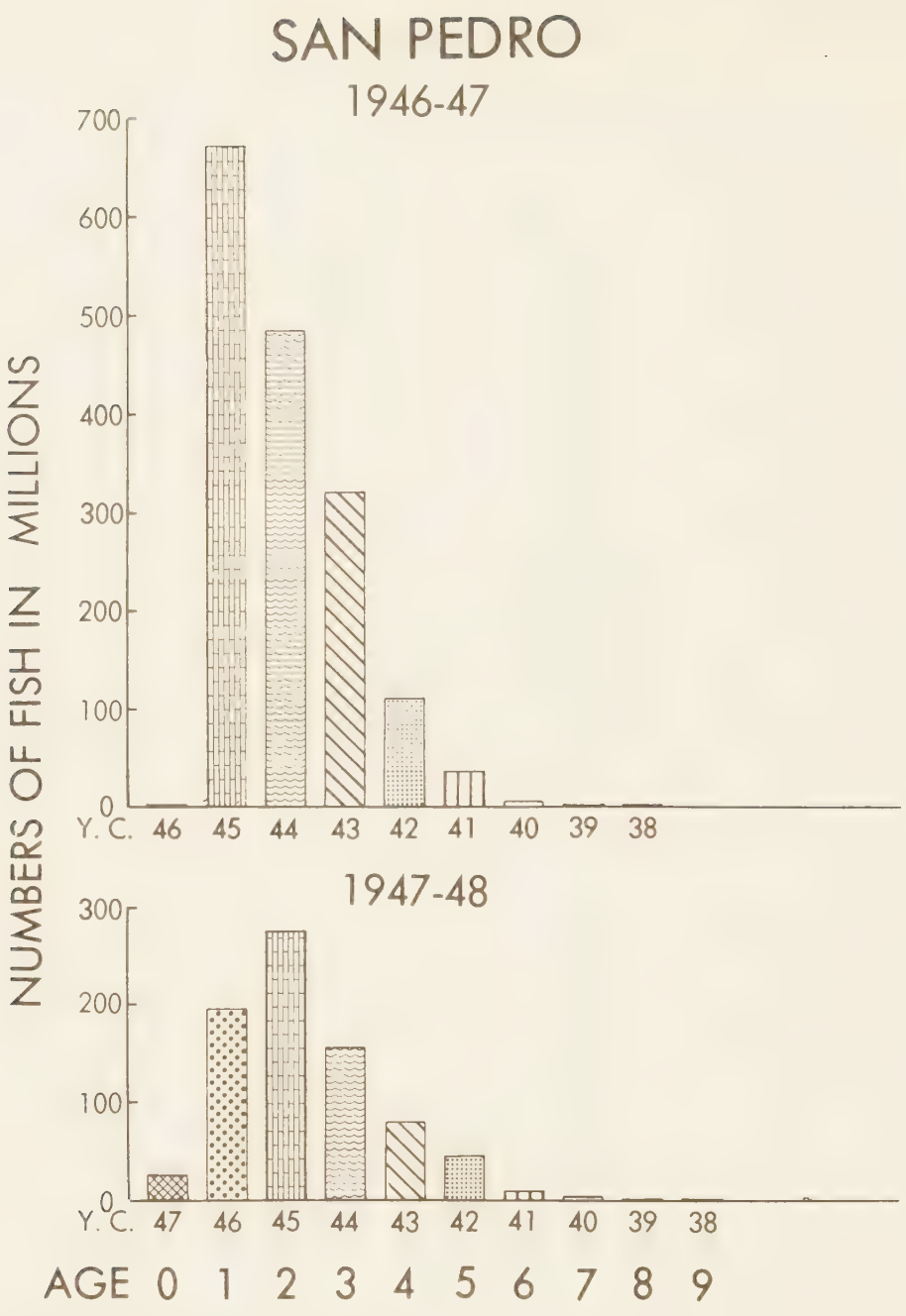

Figure 24.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1946-47 and 1947-48.

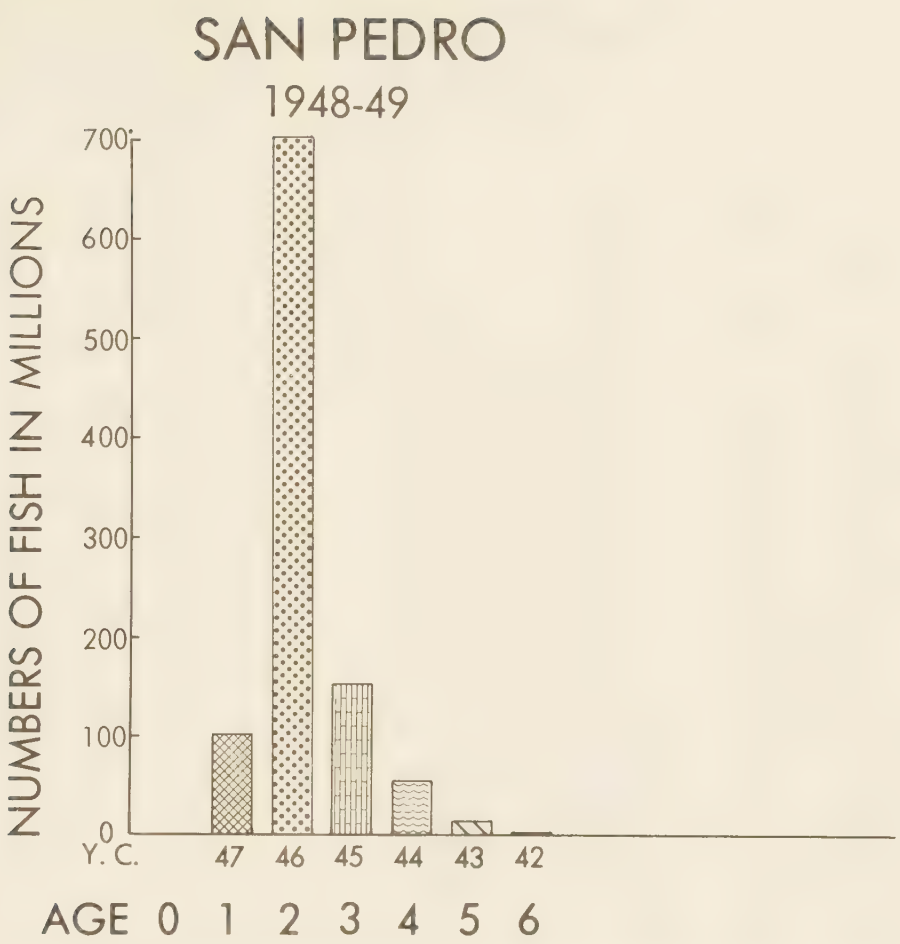

Figure 25.--Catch in millions of fish, by age and year class, for San Pedro for the season 1948-49.

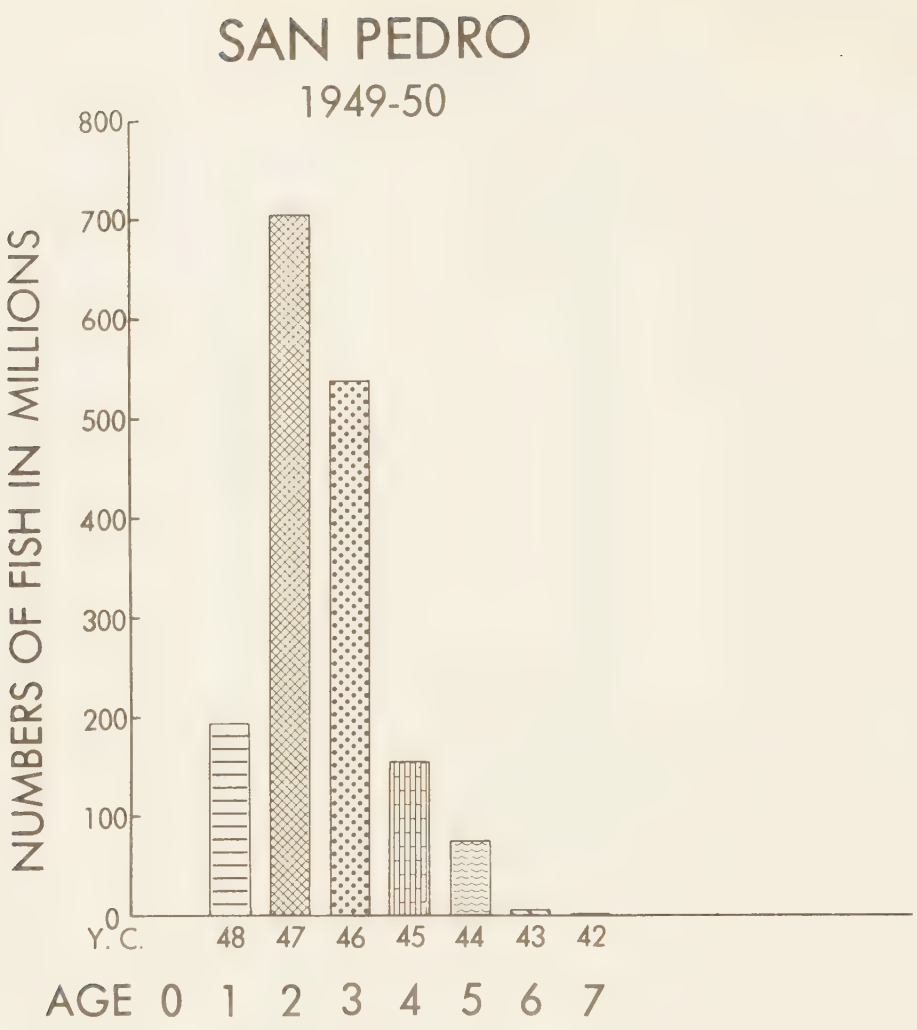

Figure 26.--Catch in millions of fish, by age and year class, for San Pedro for the season 1949-50.

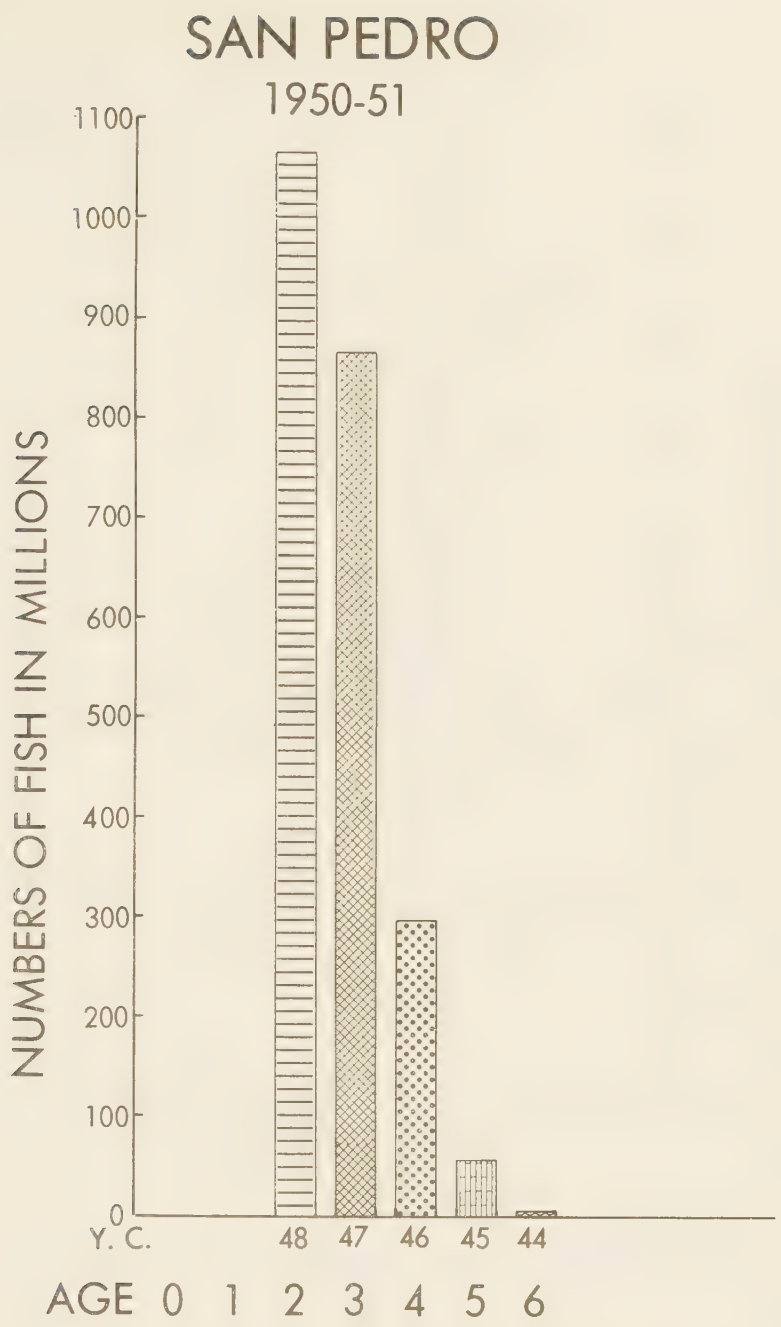

Figure 27.--Catch in millions of fish, by age and year class, for San Pedro for the season 1950-51.

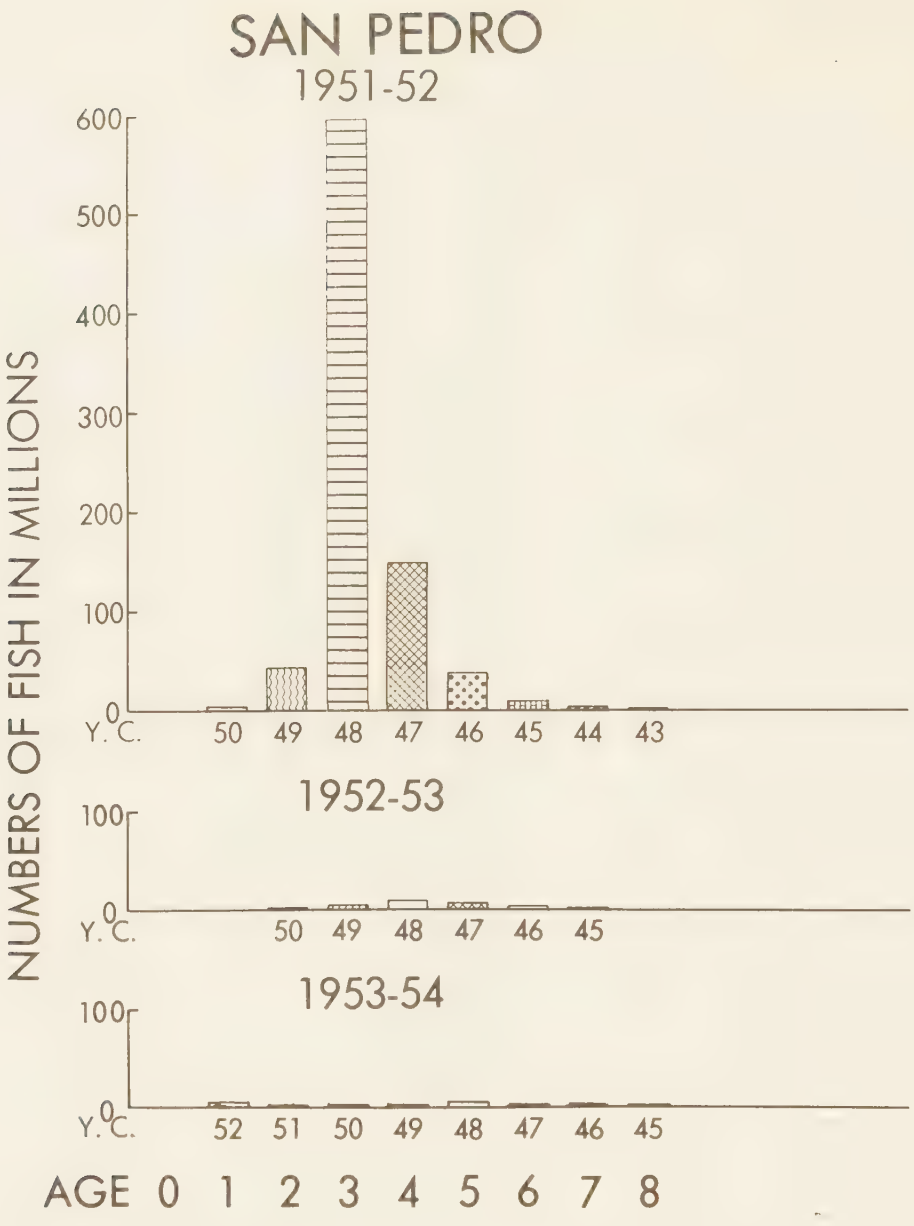

Figure 28.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1951-52 through 1953-54.

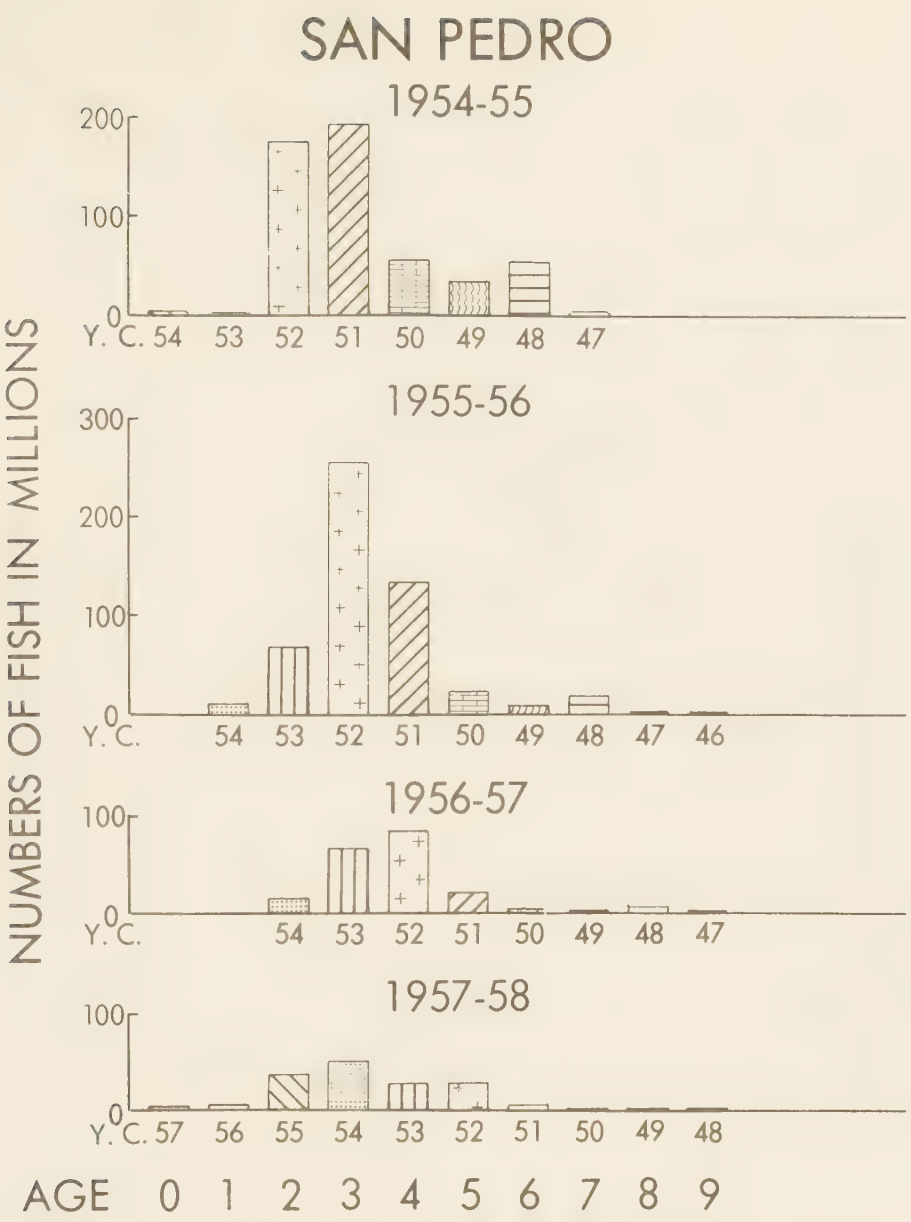

Figure 29.--Catch in millions of fish, by age and year class, for San Pedro for the seasons 1954-55 and 1955-56 and for southern California for the seasons 1956-57 and 1957-58.

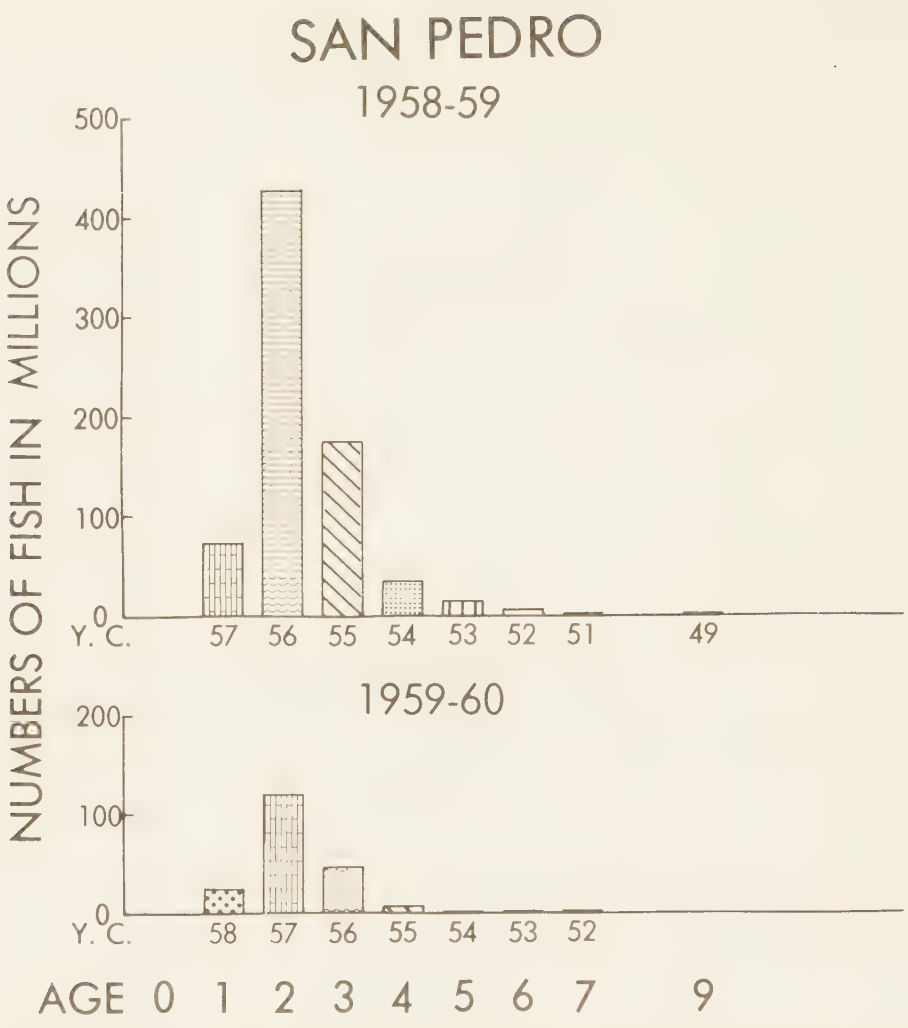

Figure 30.--Catch in millions of fish, by age and year class, for southern California for the seasons 1958-59 and 1959-60.

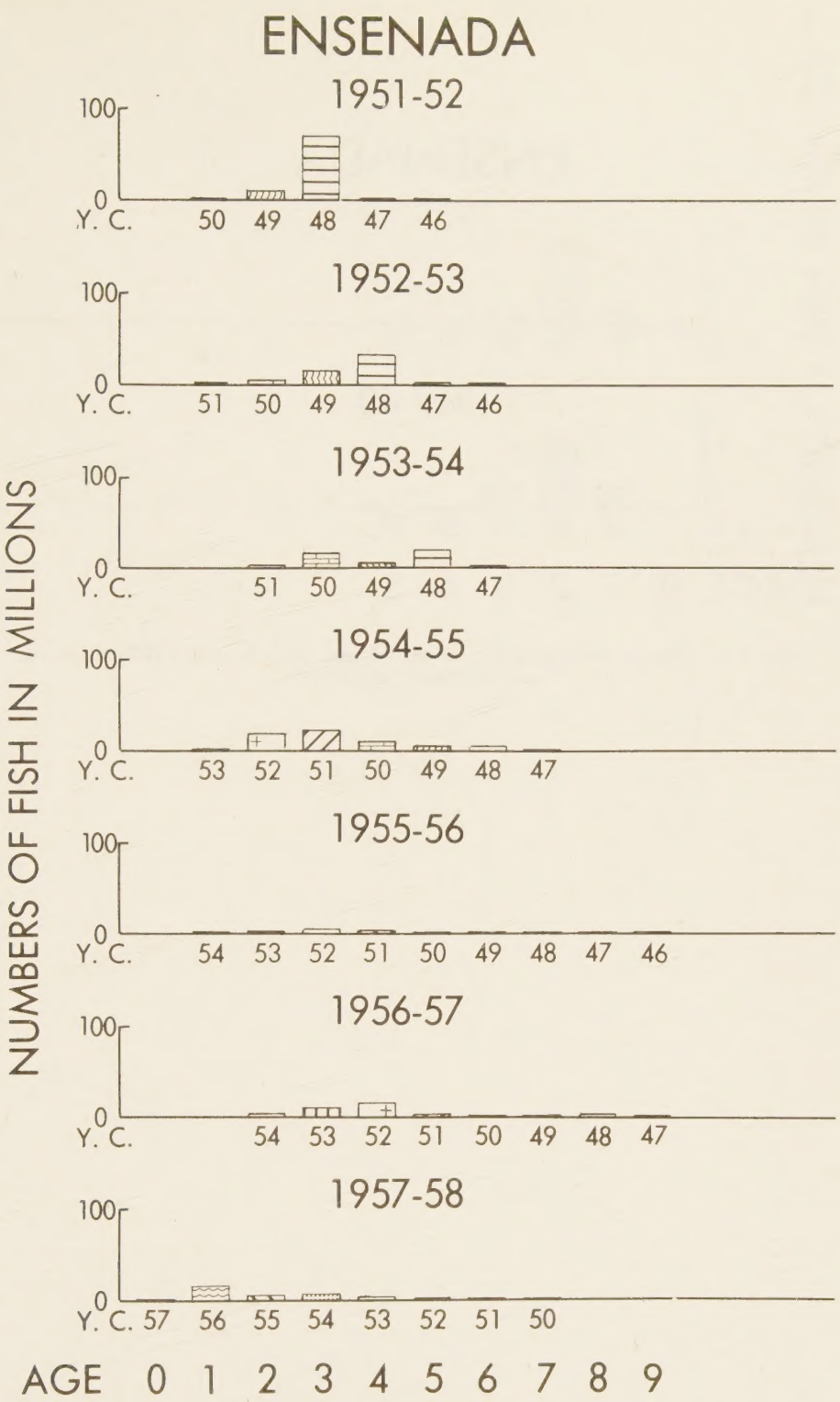

Figure 31.--Catch in millions of fish, by age and year class, for Ensenada for the seasons 1951-52 through 1955-56, and for Baja California for the seasons 1956-57 and 1957-58.

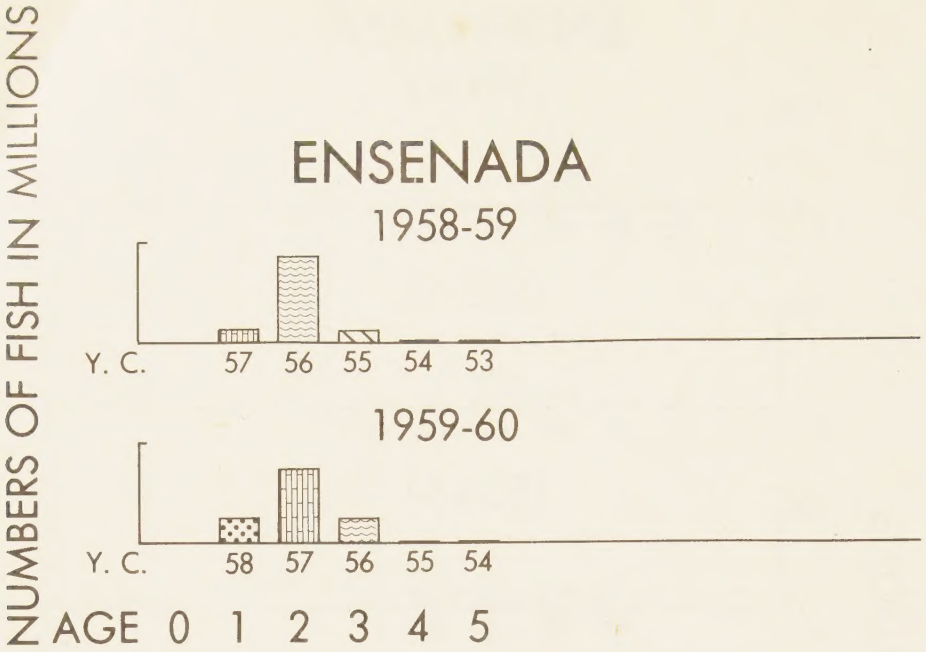

Figure 32.--Catch in millions of fish, by age and year class, for Baja California for the seasons 1958-59 and 1959-60.

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